Sometimes people do not want to hear the truth because they do not want their illusions destroyed.

Friedrich Nietsche.

God is dead.

Nietsche.

Nietsche is dead.

God.

Henk Reints MSc. (1957) is a Dutch graduated physicist (Eindhoven University of Technology, 1984). After graduation he rolled into a job in automation, where he stayed. But blood is thicker than water, and a few years ago he set himself the goal of understanding the universe conform Sir Isaac Newton's phrase:

Hypotheſes non fingo.

I do not fabricate assumptions.

At http://henk-reints.nl/u are presentations of his consistent view on the universe, derived from observed phenomena (HUDF, SDF, SDSS:DR16Q) only, without fabricating anything. To his opinion, standard cosmology has quite some serious flaws that are merely brainchildren, assumptions that were not derived from observed phenomena or other known truths and even are in contradiction with those.

https://en.wikiquote.org/wiki/Albert_Einstein:

Ernest Rutherford:

"It should be possible to explain the laws of physics to a barmaid."

Louis de Broglie:

NOUVELLES PERSPECTIVES EN MICROPHYSIQUE (1956), *New Perspectives in Physics* (1962);
whilst having a final discussion on the platform of the Gare du Nord in Paris, whence they had traveled from Brussels to attend the Fresnel centenary celebrations (June 1927)**:**

(...) he (**Albert Einstein**) told me that all physical theories, their mathematical expression apart, ought to lend themselves to so simple a description 'that even a child could understand them'.

https://en.wikiquote.org/wiki/Albert_Schweitzer:

It is the fate of every truth to be an object of ridicule when it is first acclaimed.

In theory, there is no difference between theory and practice, but in practice, there is.

Nothing should be more empirical than theoretical physics.

Ever realised?

- progress of time:
  Minkowski's ict coordinate grows at speed of light;
- spatial expansion of universe:
  Hubble distance grows at speed of light;
- Special Relativity = rotation in Minkowski space[1];

⇒ progress of time not just related to,
but identically very same as cosmic expansion;

⇒ SR already implies expansion of universe.

[1] If using ict instead of ct .

Speed of light:

not primarily the velocity at which light propagates, but:

ratio of: that what we perceive as *distance*

and: that what we perceive as *time*;

⇒ **very fundamental characteristic of the cosmos;**

light just gets it pushed down the throat;

typically: $\boldsymbol{c = D_H / t_H}$;

$\boldsymbol{D_H}$ **grows at** $\boldsymbol{c}$ & Minkowski's ict

grows at c ⇒ $\boldsymbol{t_H}$ **grows at** $\boldsymbol{c}$;

⇒ would the speed of light change,

both D_H & t_H would change accordingly and

then the speed of light would keep the same value.

Thou shalt obey the speed limit of light:

$$c = \frac{1}{\sqrt{\varepsilon_0 \mu_0}} \therefore v < c$$

Thou shalt not excogitate!

There exists no observational evidence for anything unobservable.

Firm statements must be derived from or substantiated with ascertained truths, such as observed phenomena.

Please consult (right-click, open in new tab):

http://henk-reints.nl/astro/HR-Hubble-Lemaitre-slideshow.pdf

for a derivation of the **one and only**

correct Hubble-Lemâitre law ($\zeta \equiv z+1 = \sqrt{\frac{1+\beta}{1-\beta}}$):

current proper distance: $\boldsymbol{\rho_p = \beta_H = \frac{\zeta^2-1}{\zeta^2+1} < 1}$

(observed = light travel) distance: $\boldsymbol{\rho_l = \frac{\beta_H}{1+\beta_H} = \frac{\zeta^2-1}{2\zeta^2} < \frac{1}{2}}$

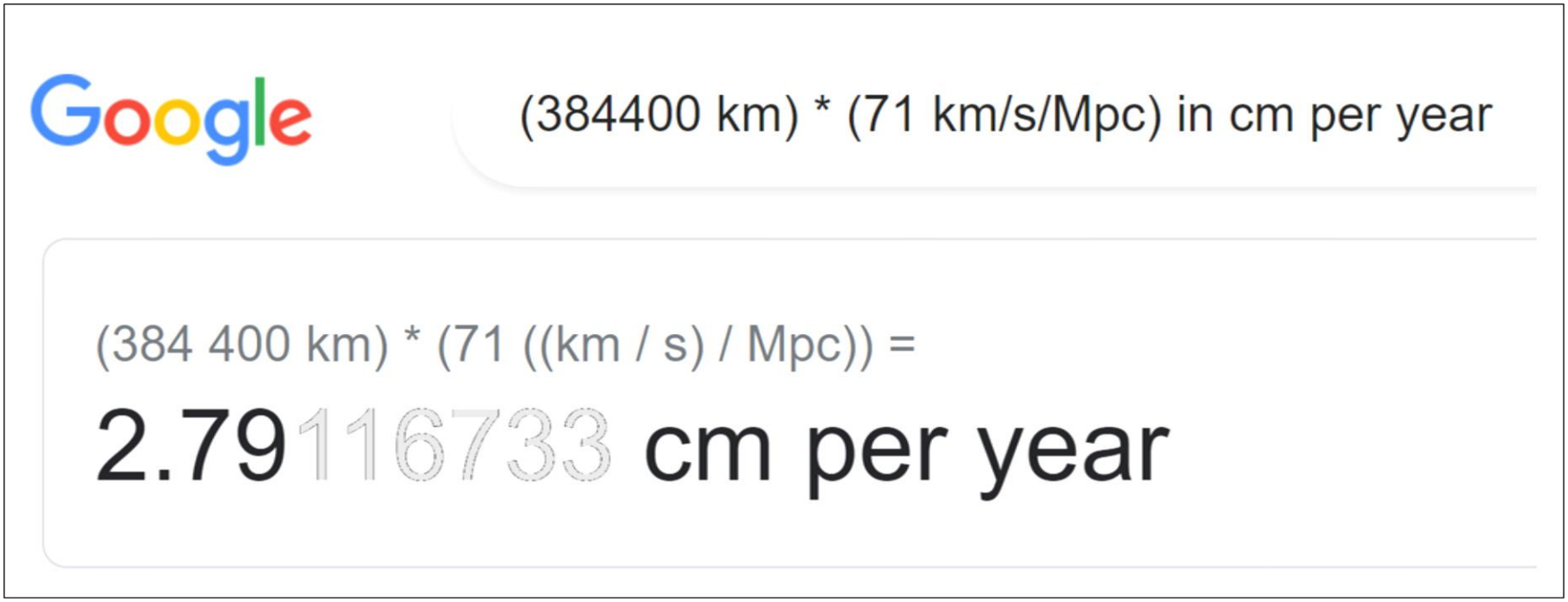
(lookback = light travel) time: $\boldsymbol{\Delta\tau_l = \frac{\beta_H}{1+\beta_H} = \frac{\zeta^2-1}{2\zeta^2} < \frac{1}{2}}$

proper lookback time: $\boldsymbol{\Delta\tau_{l,p} = \frac{\zeta^2-1}{2\zeta^3} < \frac{1}{3\sqrt{3}}}$

Throughout this document: $H = 71$ km/s/Mpc

Expansion of the universe:

Earth – moon distance:



Unmeasurable? (See page 103). Redshift: $z \approx 3 \times 10^{-18}$.

Add to or *part of* the *measured* 3.8 cm/year (tidal effect)?

Earth diameter $\times H \approx 0.9$ mm/year;

astronomical unit $\times H \approx 11$ metres/year $\Rightarrow z \approx 1.15 \times 10^{-15}$.

1904: *conjecture* by **Henry Poincaré**:

Every simply connected, closed, three-dimensional manifold is topologically equivalent to S^3.

2002,2003: *proven* by **Grigori Perelman**.

Cosmological Principle:

Universe is homogeneous and isotropic

when viewed on a not too small scale, i.e.

more or less ***the same*** everywhere & in any direction;

applies in particular to the laws of nature.

Same types of phenomena observed throughout firmament.

Einstein's Relativity Principle: same laws of nature to all.

Essence of **boundary**: beyond it, things are ***different***.

Proof by contradiction:

Universe is **unbounded**.

Olbers' paradox ⇒

Universe (or at least its starry content) must be **finite**.

Derived from observed phenomena:

[A]: Albert Einstein: $v < c$;

[B]: Edwin Hubble: the cosmos is expanding: $v = Hr$;

[C]: Cosmological Principle: the universe is homogeneous;

[D]: Cosmological Principle: the universe is isotropic.

Newton, R E G U L A IV (shortened).

Propoſitiones ex phænomenis collectæ pro veris haberi debent.

Propositions collected from phenomena must be considered true.

Fieri debet ne argumentum inductionis tollatur per hypotheſes.

No evidence by induction should be gainsaid by assumptions.

Do you accept these propositions, derived from facts of experience, as ascertained truths?

Premises, derived from observed phenomena:

[A]: Albert Einstein: $v < c$;

[B]: Edwin Hubble: the cosmos is expanding: $v = Hr$;

[C]: Cosmological Principle: the universe is homogeneous;

[D]: Cosmological Principle: the universe is isotropic.

Deduction:

[1]: [B] $\vdash$ the universe had a beginning;

[2]: [A] $\wedge$ [1] $\vdash$ the universe is finite;

[3]: [C] $\wedge$ [D] $\vdash$ the universe is unbounded;

[4]: [2] $\wedge$ [3] $\vdash$ the universe is closed;

[5]: [D] $\vdash$ the universe cannot be a 3-torus;

[6] [4] $\wedge$ [5] $\vdash$ **the universe is a *glome* (3-sphere).**

Q.E.D.

DEDUCTION YIELDS A CERTAINTY

but only an ascertained truth if all premises are true, okay.

A flawless deduction yields *absolute certainty*!

A flawless deduction from truths yields a ***truth***!

You ***did*** accept the premises as ***truths***, didn't you?

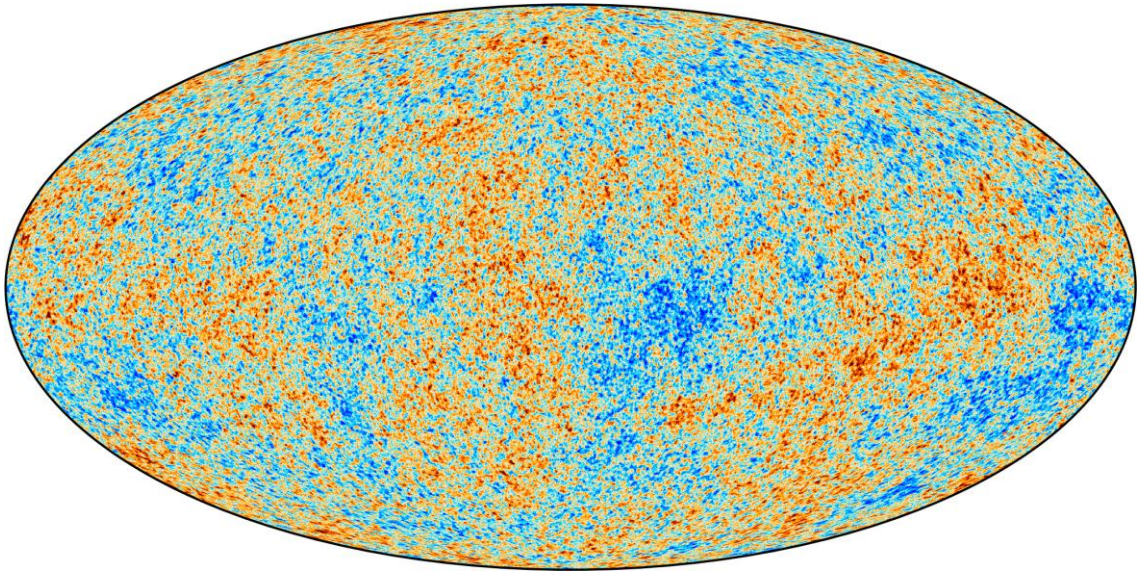
You ***must*** accept this deduction result as a ***truth***!

If not, then please explain your reluctance,
but ***DON'T*** pick any argument from thin air!

Why no confidence in a deduction from truths?
Why think up something else?

Fieri debet ne argumentum inductionis tollatur per hypotheſes.
No evidence by induction should be gainsaid by assumptions.

Severe **confirmation bias**:



Back in 2012 or so, this image was shown on TV as hot news &

a scientist said: "*In this image, I can see the universe is flat*".

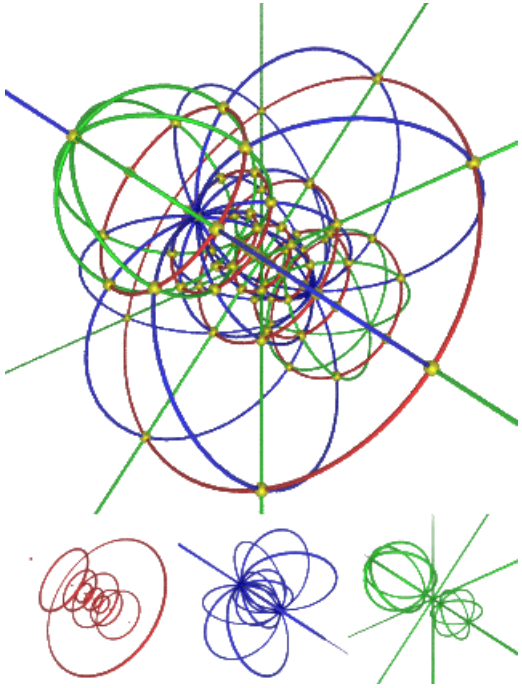
My 1st thought then was: "*And I can see an easter egg*".

Magritte: "Ceci n'est pas un œuf de Pâques".

Shakespeare: "Un œuf no more. Tis not so sweet now as it was before".

Today, I doubt if *any*one can ***see*** that a 3-sphere be flat.

Glome / 3-sphere:



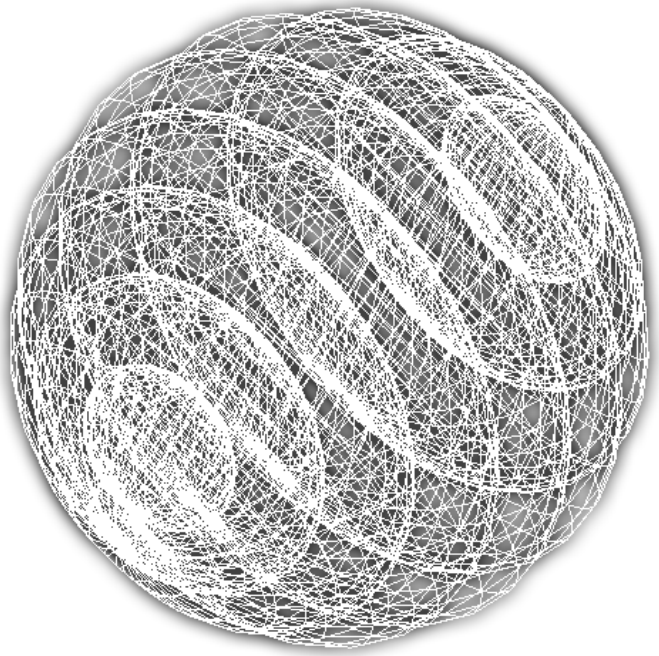
Stereographic projection of the hypersphere's parallels (red), meridians (blue) and hypermeridians (green). In this picture, the whole 3D space maps the surface of the hypersphere.

I have daltonism!

The problem with these images is that we are in no way capable of visualising anything 4D, even if projected on 3D, especially when that projection itself is projected once again on 2D, like here.

As if you would try to explain a ball to a "flatlander" by showing him a line segment.

Dutch: Hij snapt er geen bal van...

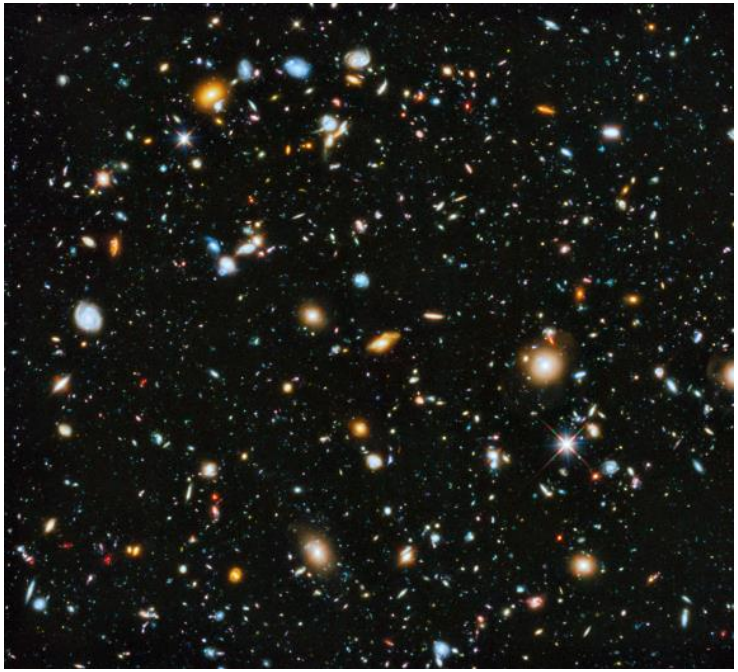


Direct projection of 3-sphere into 3D space and covered with surface grid, showing structure as stack of 3D spheres (2-spheres).

Can YOU distinguish front and rear?

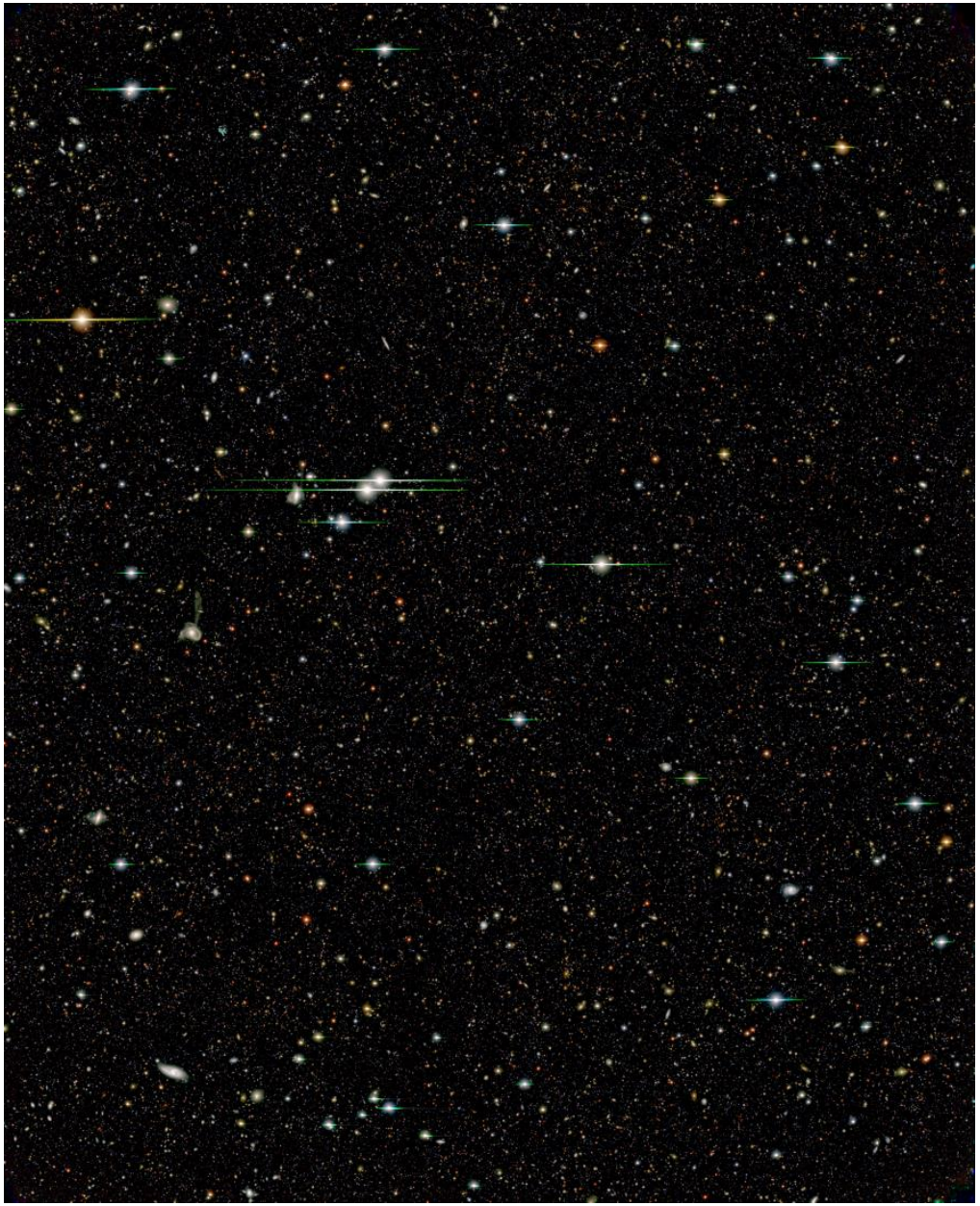
en.wikipedia.org/wiki/3-sphere

But the universe actually looks like these images, doesn't it?



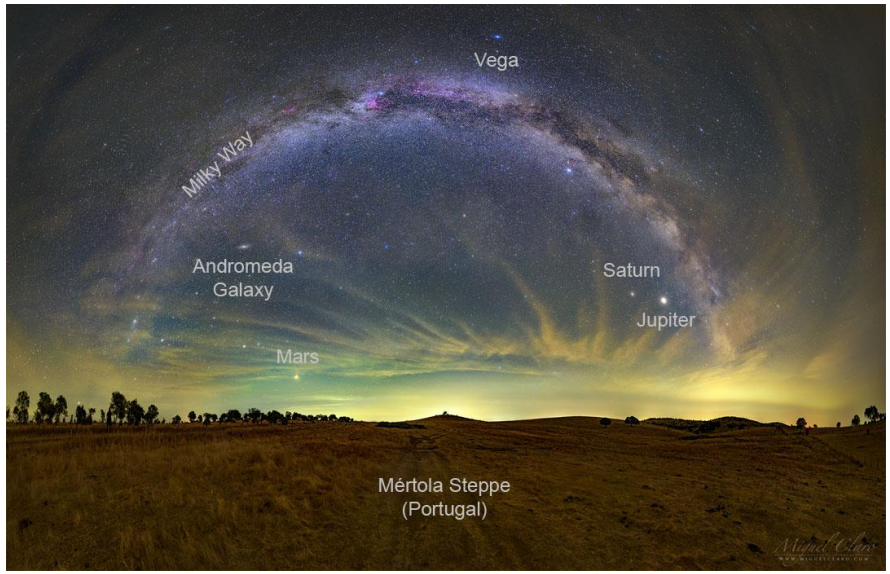
The Hubble Ultra Deep Field *(same scale as SDF)*

The large image is the *Subaru Deep Field*, containing some 1.4 million objects. It obviously is not nearly like the last images. Or is it?



Understanding something incomprehensible:
do not try to visualise a 3-sphere
as seen from its outside, but only from within it.

It *IS* what you see when you watch the firmament!



De Sterrennacht / Starry Night

KLIEDERWERK / MESSY DOODLE

http://henk-reints.nl/HR-geodesics.pdf
contains a derivation of 2S & 3S-geodesics & other 3S-equations,
as well as some tips for understanding the thing.

Antipodal point

http://www.saltooo.be/Cartoon.aspx?Id=Jetlag

in 3-spherical universe:

the very far end of EVERY line of sight in ANY direction is identically the very same single point.

The AP seemingly surrounds us completely (4π).

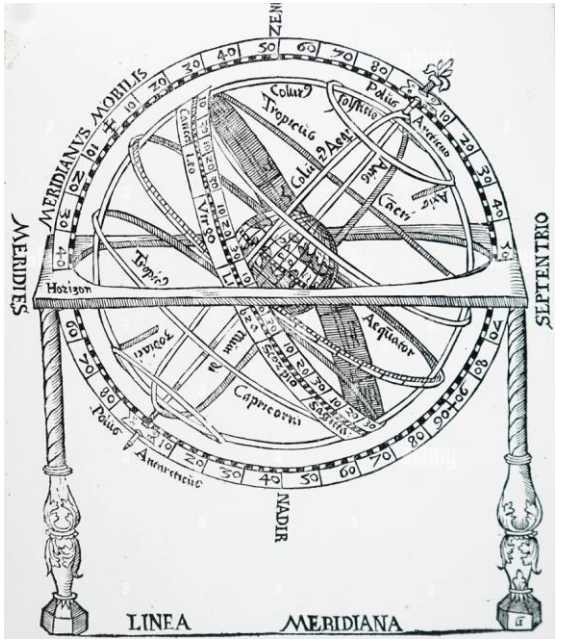
$D_{AP} = D_H$ ∴ we cannot ever look beyond it since it recedes at the speed of light, yielding an unsurpassable barrier.

As seen from ***your*** own antipodal point,
you are a sphere all around the entire cosmos!

A circle of latitude with a radius measured (at Earth's surface) from the North Pole also is a circle of latitude around the South Pole with a radius measured from there, be this cirle on the northern or the southern hemisphere. Its *inner* area as seen from the North is its *outer* area as seen from the South and v.v. Together, inner & outer area of either NP or SP equal Earth's total surface area.

3-spherical cosmos: a large sphere around us with a radius exceeding half the antipodal distance also is a smaller sphere around the antipodal point. Its *inner* volume as seen from here is its *outer* volume as seen from there and v.v. Together, inner & outer volume of either here or our *AP* equal total volume of cosmos.

Both 2S & 3S: when you make a clockwise pirouette whilst residing in my antipodal point, I can keep watching your face by rotating anti-clockwise, so you seemingly *orbit* me (& vice versa).



the "entire" cosmos, so this is how a glome looks like...

The greatest distance in the universe is the Hubble distance.
The greatest distance in a glome is half its circumference,
i.e. the distance between two **antipodal points**.

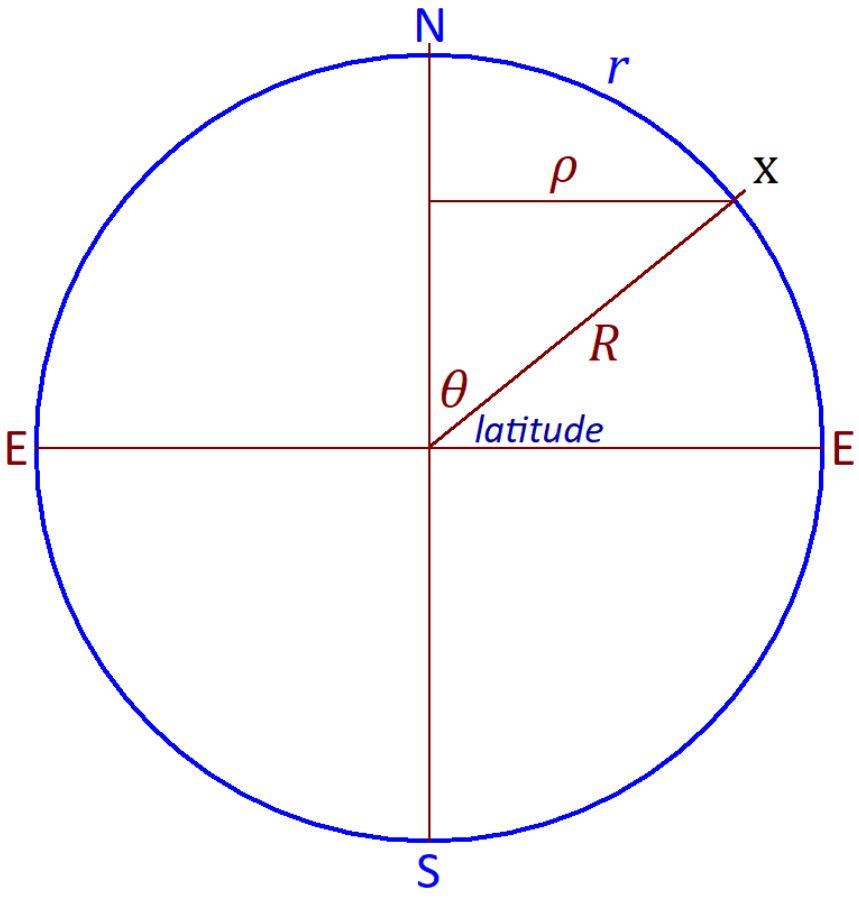
Wouldn't it not be not very illogical
if they weren't not unequal? ☺

With $D_H > D_{AP}$ there would be an overlap around any A.P.
With $D_H < D_{AP}$ there would be a hole in the cosmos, dear Liza.

Both are in conflict with the Cosmological Principle.
And with a hole in it, the universe would not be closed.

And ANY point of the universe is the antipodal point of its own antipodal point, e.g. also right HERE, where WE live, and please look around, everything seems completely normal (but me).

Circles of latitude on Earth:



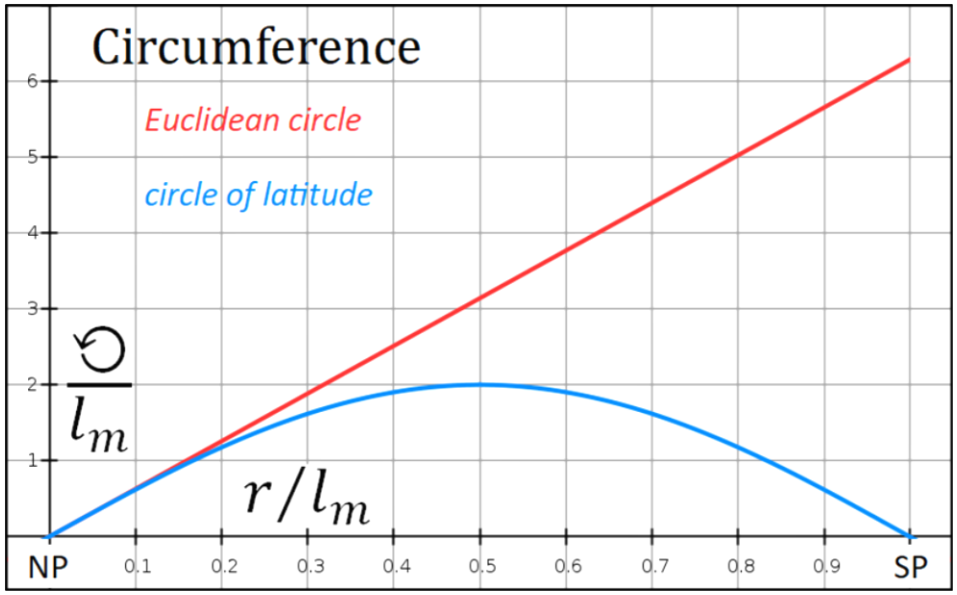
Circumference of Euclidean circle: $\circlearrowleft_E = \mathbf{2\pi r}$

Circumference of circle of latitude on a sphere: $\circlearrowleft_S = 2\pi\rho$

→ $\rho = R\sin\theta$

→ $\theta = \frac{r}{R}$

yielding: $\circlearrowleft_S = \mathbf{2\pi R \sin\frac{r}{R}}$



We found: $\circlearrowleft_S = 2\pi R \sin\frac{r}{R}$

meridian length: $l_m = \pi R$

$\therefore R = \frac{l_m}{\pi}$

hence: $\circlearrowleft_S = 2l_m \sin\left(\pi\frac{r}{l_m}\right)$

dimensionless: $\frac{\circlearrowleft_S}{l_m} = 2\sin\left(\pi\frac{r}{l_m}\right)$

Euclidean: $\frac{\circlearrowleft_E}{l_m} = 2\pi\frac{r}{l_m}$

If measured circumferences of circles of latitude

would fit to the red curve, then Earth would be flat,

and if they fit to the blue curve, Earth is spherical.

That is how we can determine if Earth is flat or round.

Instead of circles of latitude,

a glome has balls

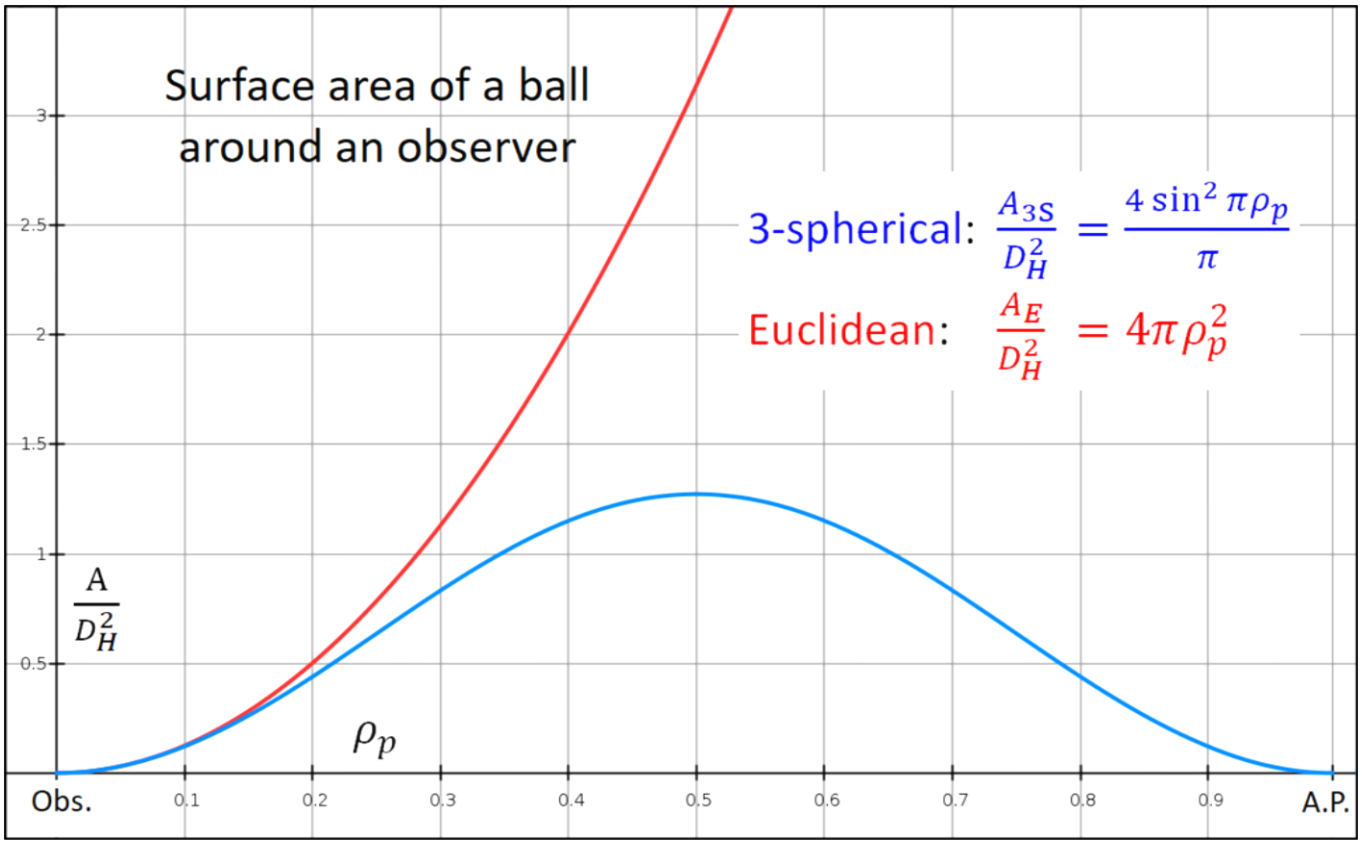
of latitude, which in fact are 3-sphere caps.

Universe's antipodal distance: $l_m \equiv D_H$

dimensionless proper radius: $\frac{r}{D_H} \equiv \rho_p$

BOL's surface area: $\frac{A_{3S}}{D_H^2} = \frac{4 \sin^2 \pi\rho_p}{\pi}$

Euclidean ball: $\frac{A_E}{D_H^2} = 4\pi\rho_p^2$



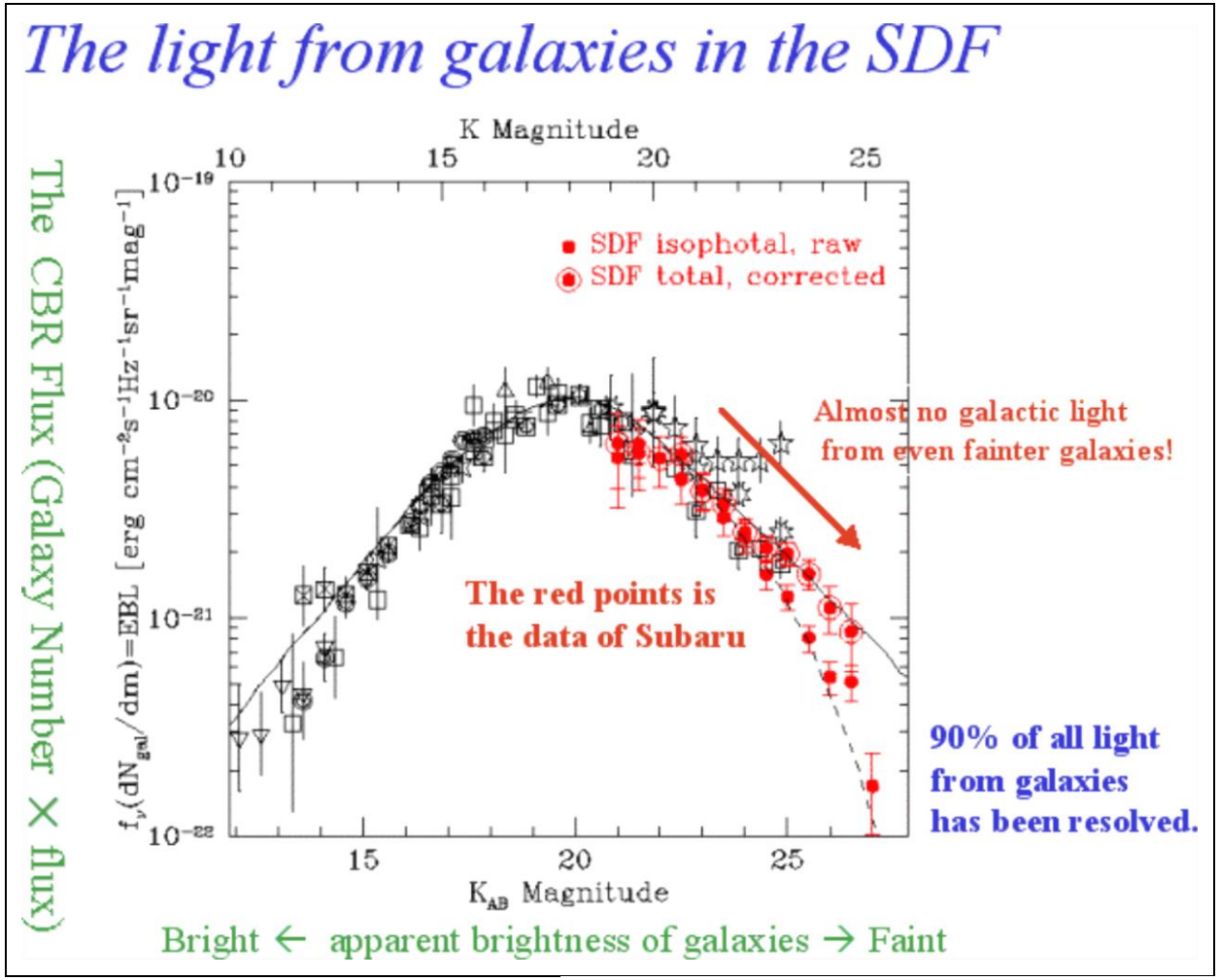
We can determine the geometry of the universe by measuring the surface areas of various balls around us.

How? The C.P. says the universe is homogeneous, so the number of objects at a given distance is a direct measure of this surface area.

1st half of 2017:

Found next graph of CBR flux against magnitude.

It made me smile!



https://subarutelescope.org/Pressrelease/2001/04/30/Fig2_e.gif

Apparent magnitude is however just a rough non-linear indication of distance

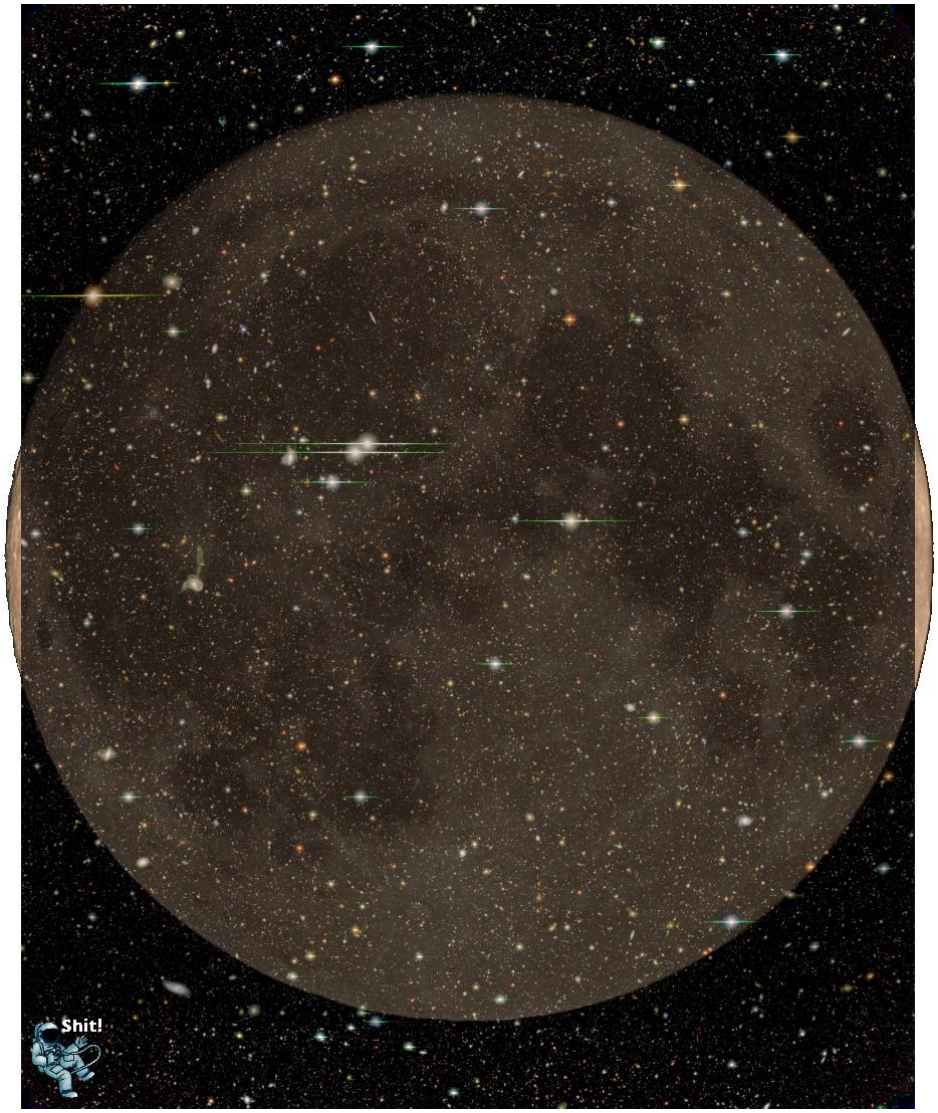
and *CBR flux* is not the object count, although strongly related.

Furthermore, it appeared to be from an old SDF (Subaru Deep Field) image with merely ~350 galaxies:

https://subarutelescope.org/old/Pressrelease/2001/04/30/
https://subarutelescope.org/old/Pressrelease/1999/09/16c/SDF_300.jpg

November 2018:

Finally found catalogs of the newer large SDF:



1.4 million objects;

magnitudes;

apparent sizes;

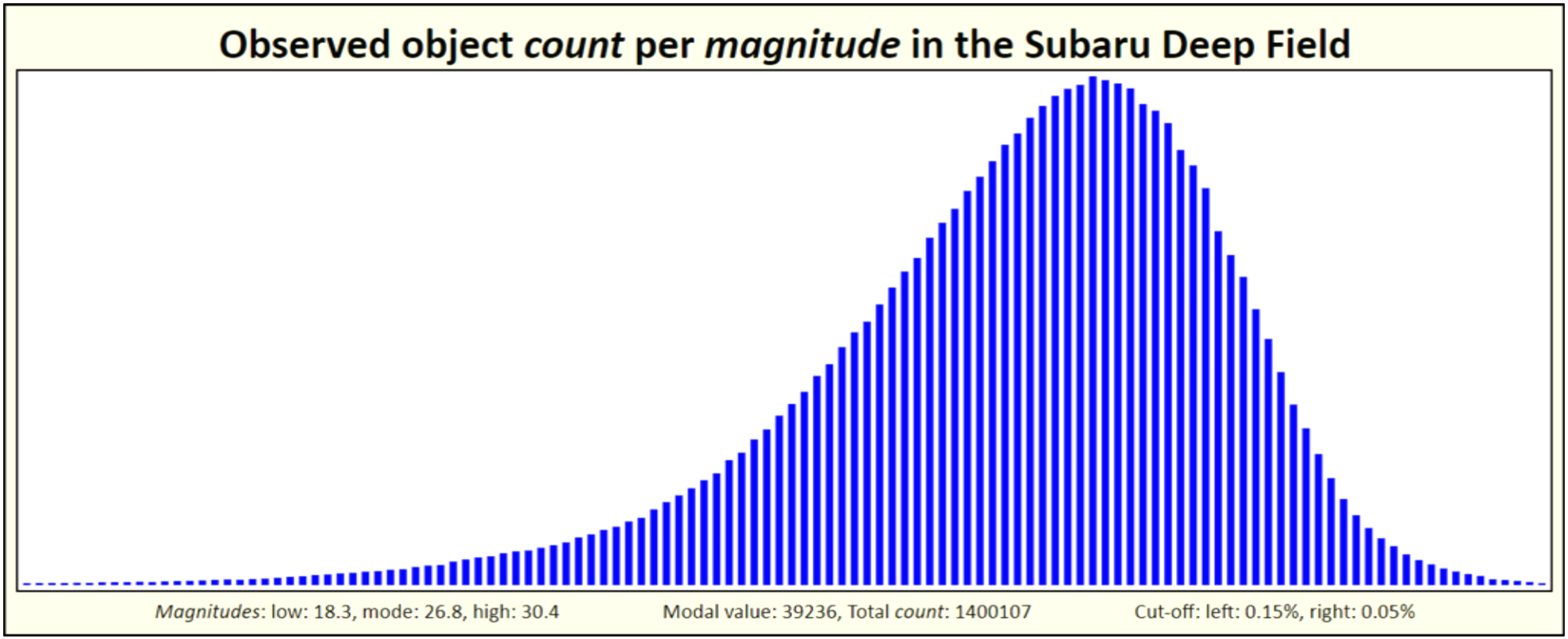
field angle: $30' \times 37'$.

http://soaps.nao.ac.jp/SDF/v1/index.html

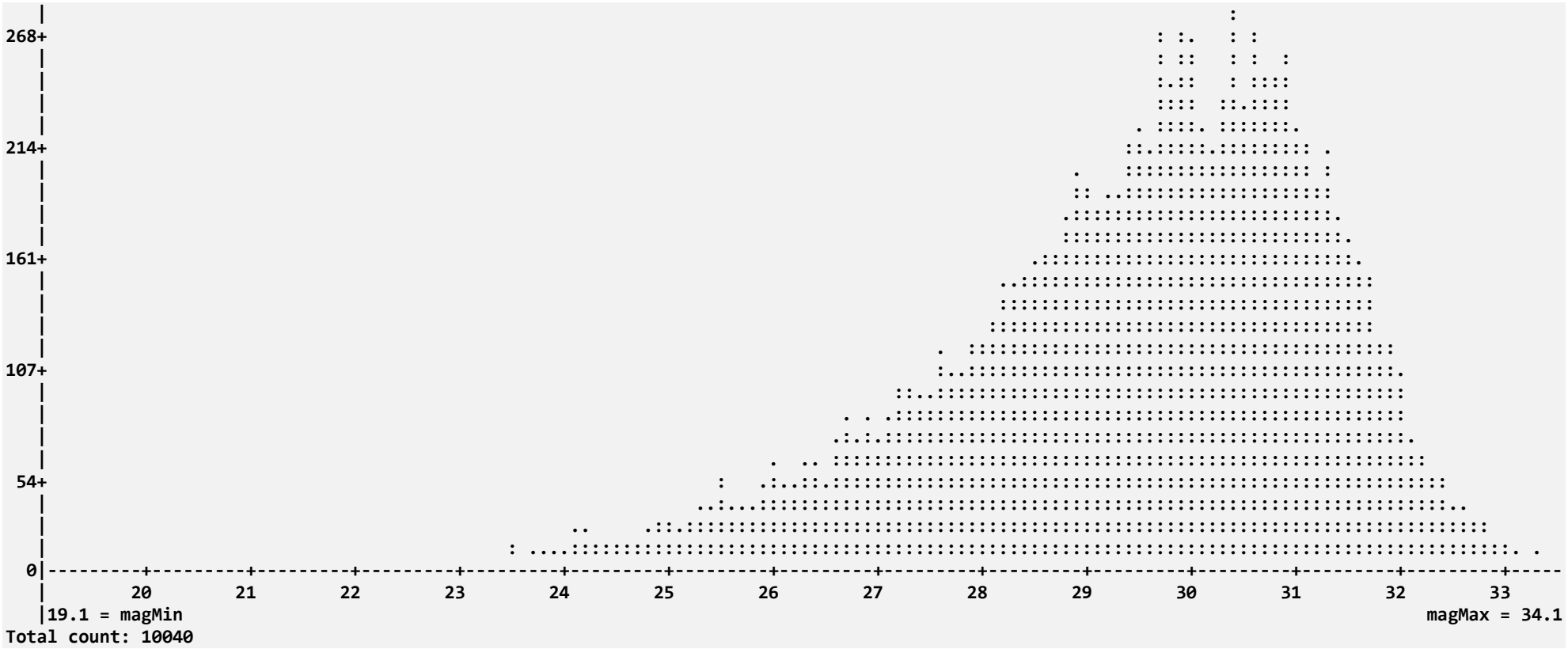
Downloaded and analysed:

1. http://soaps.nao.ac.jp/SDF/v1/B/sdf_v1_B.cat.gz
2. http://soaps.nao.ac.jp/SDF/v1/V/sdf_v1_V.cat.gz
3. http://soaps.nao.ac.jp/SDF/v1/Rc/sdf_v1_Rc.cat.gz
4. http://soaps.nao.ac.jp/SDF/v1/ip/sdf_v1_ip.cat.gz
5. http://soaps.nao.ac.jp/SDF/v1/zp/sdf_v1_zp.cat.gz
6. http://soaps.nao.ac.jp/SDF/v1/816/sdf_v1_816.cat.gz
7. http://soaps.nao.ac.jp/SDF/v1/921/sdf_v1_921.cat.gz

SDF count per magnitude:



Hubble Ultra Deep Field count per magnitude:



Similar to that of the SDF, but a way smaller sample size

(10 040 vs. 1.4 million), not further analysed.

https://heasarc.gsfc.nasa.gov/W3Browse/hst/hubbleudf.html

https://cdsarc.cds.unistra.fr/ftp/cats/II/258/

HUDF: {RA: $41°.2$, dec: $-45°.2$}, SDF: {RA: $187°.5$, dec: $33°.4$}, $\theta_{\text{encl}} \approx 152°$

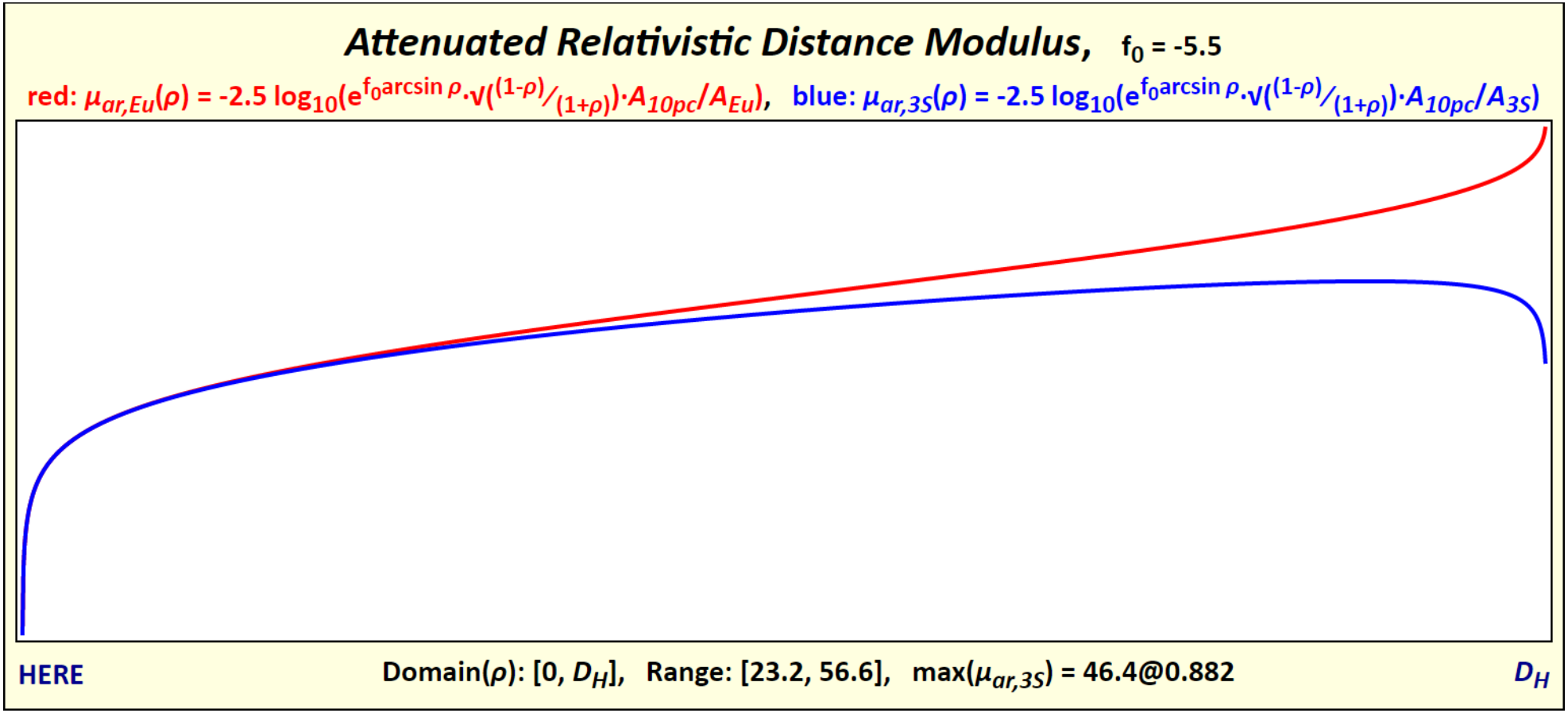
Magnitude is about the amount of light *currently* observed, not depending on light travel time or distance, nor on the object's Hubble velocity or expansion of the universe. An object's light apparently comes from the centre of a *current* sphere around it, having this centre at the object's current proper distance.

Attenuated relativistic distance modulus:

$$\mu_{ar} = m - M = -5\log_{100}\left(e^{\mathrm{f_0}\arcsin\rho} \cdot \sqrt{\frac{1-\rho}{1+\rho}} \cdot \frac{A_{10\mathrm{pc}}}{\{A_E|A_{3S}\}} \right)$$

$\mathrm{f_0}$ is an attenuation coefficient to be calibrated.

After some  : $M = -18,\ \mathrm{f_0} = -5.5$



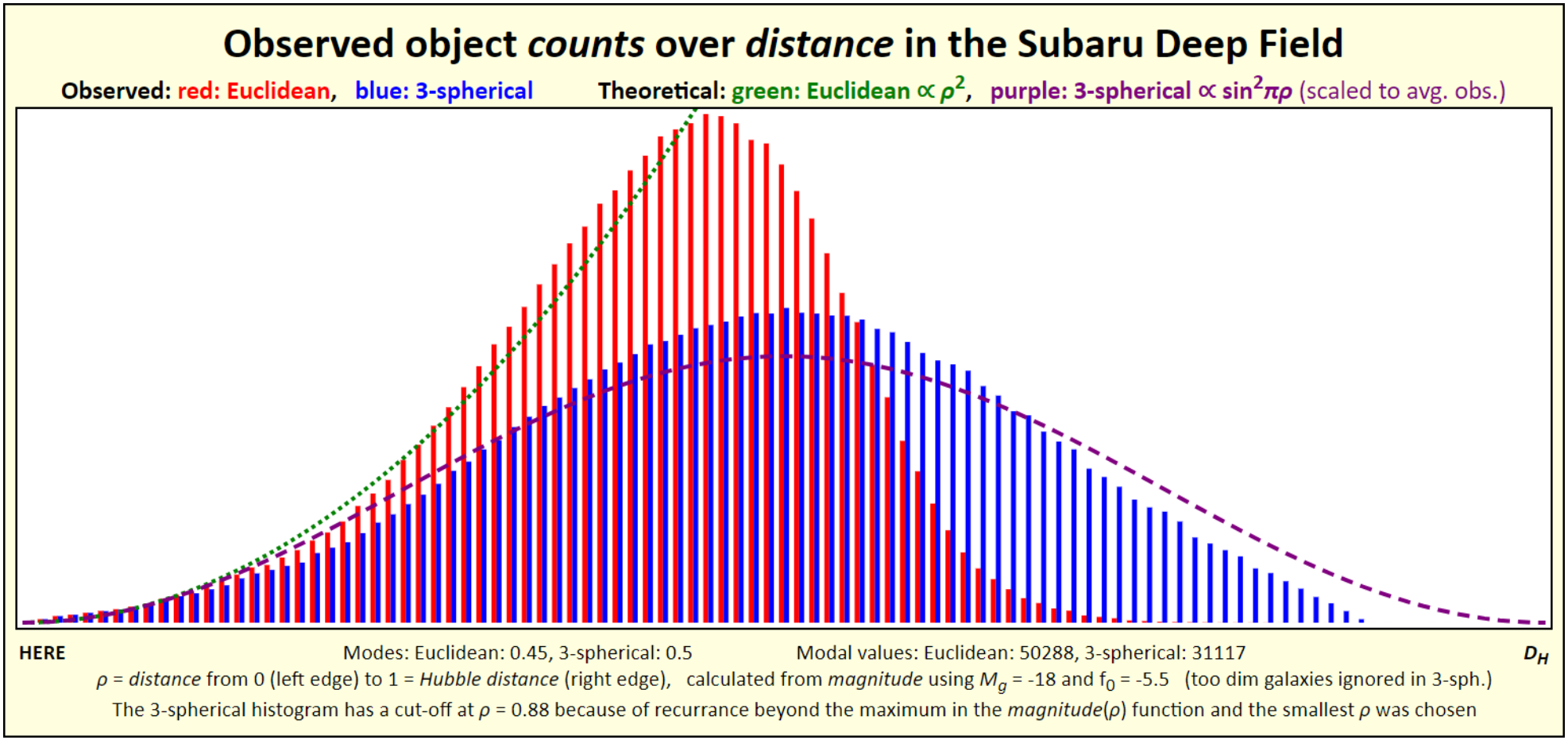
The 3-spherical curve descends for VERY distant objects

(which explains the brightness of the CMB!)

so it cannot be properly inverted.

Choice: smallest of the two possible distances.

SDF count vs. proper distance:



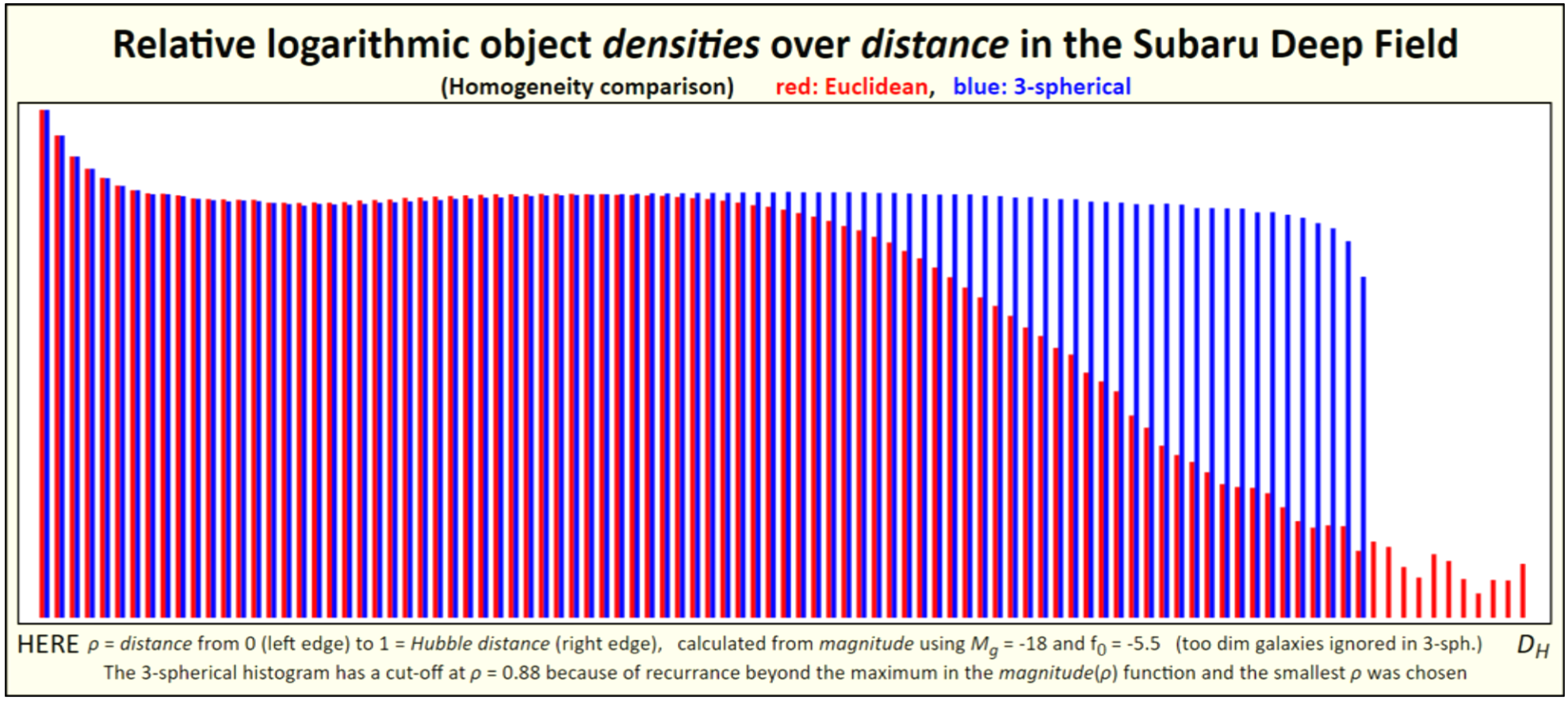
Euclidean: theory perpendicular to reality for $r \gtrsim D_{\mathrm{H}}/2$;

3-spherical: nearly perfect, with superimposed harmonic?

BIG BOOOOOOM instead of **BIG BANG?**

Homogeneity:

SDF object number density vs. proper distance:



$$d_r := \text{relative distance:} \frac{\text{distance between 2 objects}}{\text{greatest of their diameters}}$$

Andromeda nebula & **Milky Way**: $d_r \approx 11.5$

*Orion's **B**eautiful **B**onny **B**lush **B**y DeepSkyColors.com.*

*Hera's **B**eautiful **B**are **B**oobs **B**y Rubens: Origin of the Milky Way.*

Arbitrary: *collision candidate*: $d_r < 12.5$

Let's say half of the candidates will indeed collide.

Subaru Deep Field (1.4 mln. objects):

$\sim 5.4\%$ have at least 1 collision candidate.

Then it also IS a candidate and one of the two is the larger,

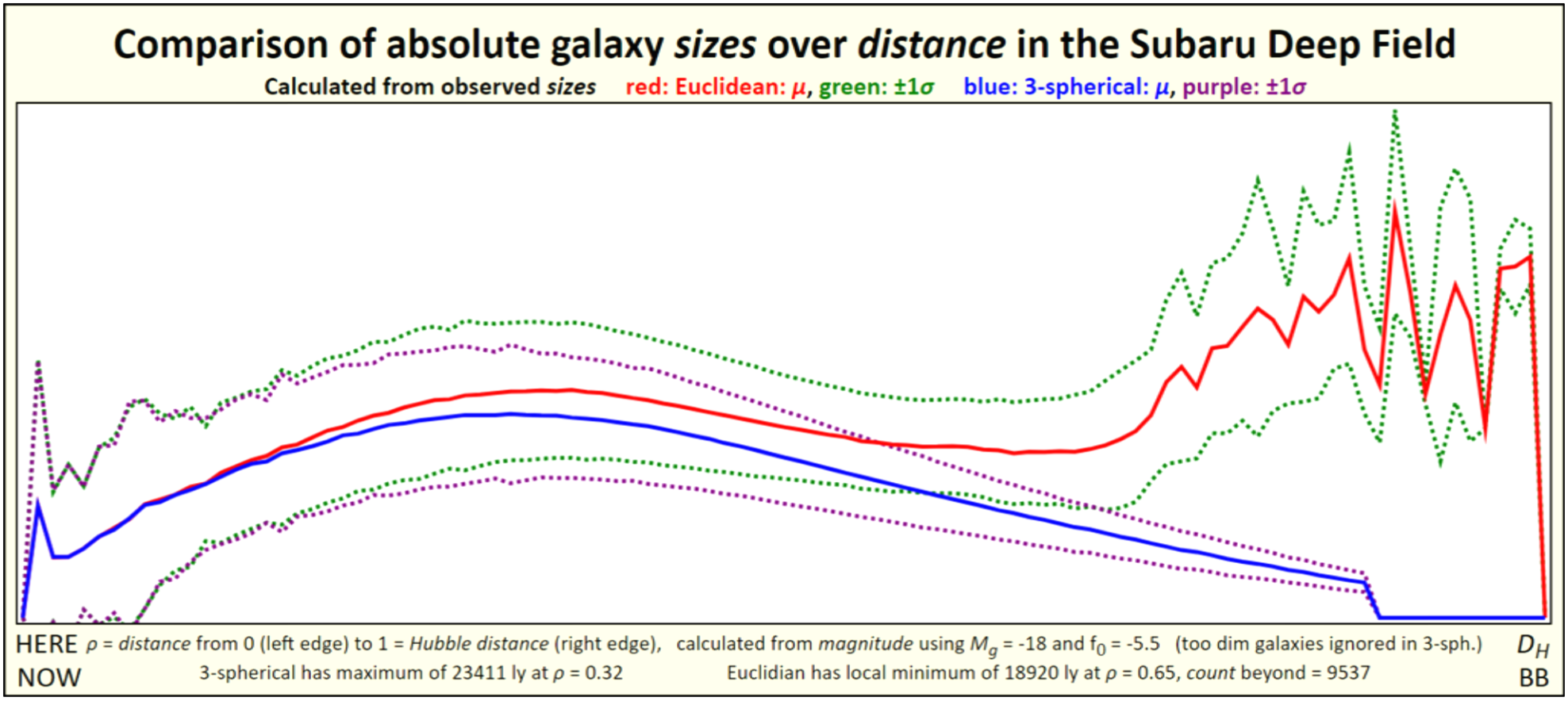
so we can estimate that about $\frac{1}{2} \cdot \frac{5.4\%}{2} = 1.35\%$

will actually swallow a smaller neighbour.

Conclusion:

In general, galaxies do not
grow by feasting on others, but

they grow by intragalactic expansion of the universe:



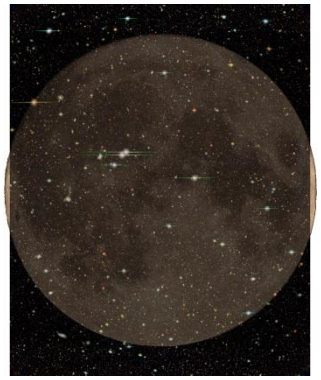
Decline towards left? SDF purposely has as few nearby objects as possible.

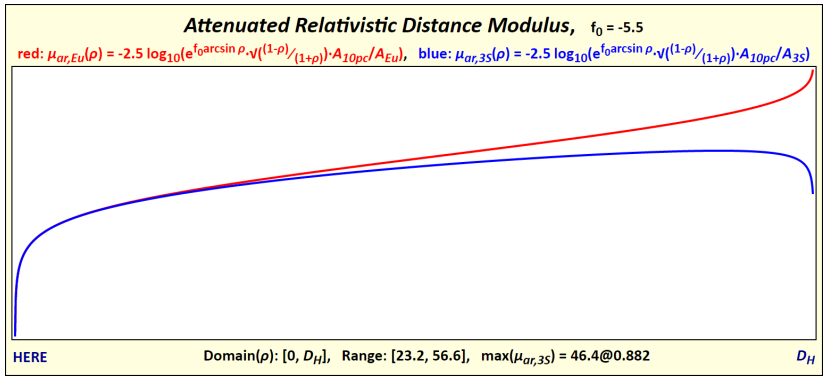
3S: expansion (R to L) of universe as linear as can be,

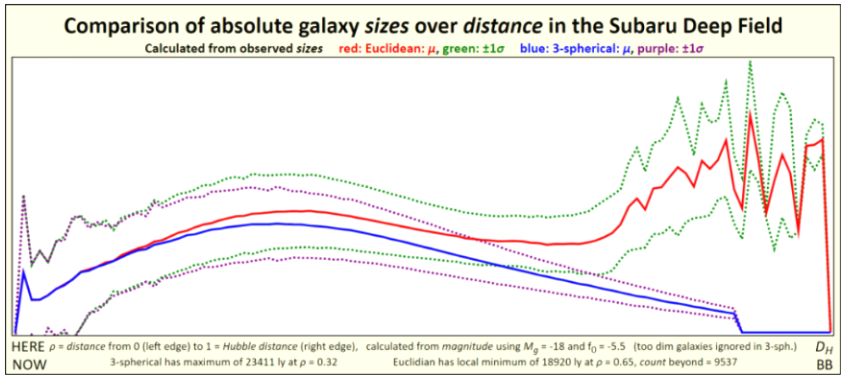
straight from nought at big bang (far right).

How has it been derived?

Step 1:	step 2:	step 3:
SDF calatogs:	**distance calculated from magnitude:**	**angular size to absolute in Eucl. & 3S geometry:**







Ex obſervatis phænomenis immediate deductum eſt

& hypotheſes non finxi!

Solus ineptus stultus hoc serio non tulerit!

Only an inept dunce would not take this seriously!

Conclusions from the Subaru Deep Field:

- **The universe absolutely definitely is a glome;**
- **it expanded as linearly as can be, straight from nought at the big bang;**
- **there has never ever been any inflationary phase of the universe.**

Ex obſervatis phænomenis deductum eſt
& hypotheſes non finxi.

- CMB source must be relatively small entity around antipodal point, which is perceived in ANY direction;
- CMB brightness is due to steep decline of 3-spherical attenuated relativistic distance modulus near far end of Hubble distance;

3-sphere's hyper radius growing at c/π CANNOT be Minkowski's ict coordinate, so not within scope of General Relativity.

Then what is it?

Nescio & hypotheſes non fingo.

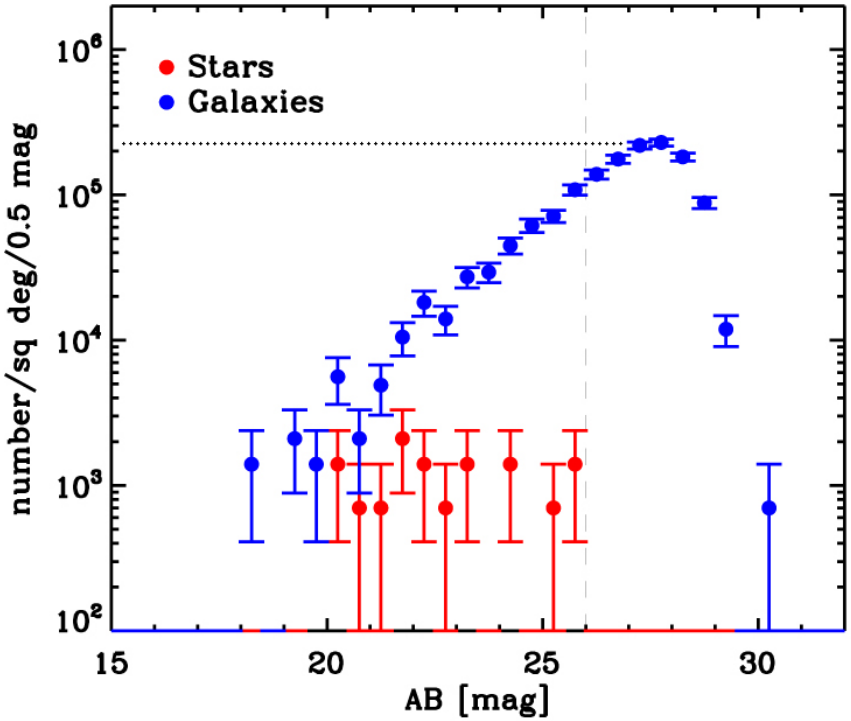
¿Qué?

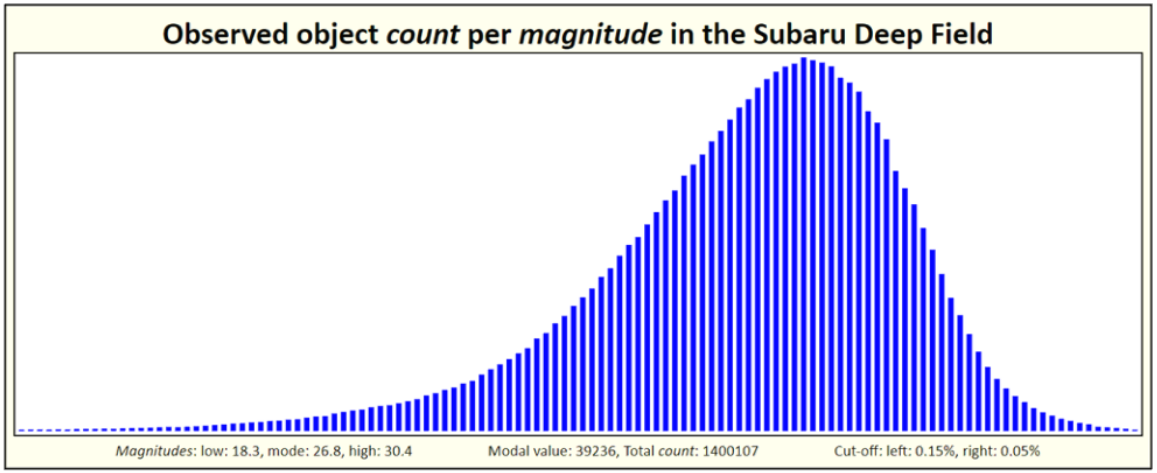
I know nothing...

2022-12-14: JWST PEARLS. Prime Extragalactic Areas for Reionization and Lensing Science: Project Overview and First Results

Rogier A. Windhorst *et al* 2023 *AJ* **165** 13, DOI 10.3847/1538-3881/aca163
https://iopscience.iop.org/article/10.3847/1538-3881/aca163/pdf via
https://webbtelescope.org/contents/early-highlights/webb-glimpses-field-of-extragalactic-pearls-studded-with-galactic-diamonds

Part of fig.6 vs. magnitude histogram of Subaru Deep Field:





Magnitude range: low:18.3, mode: 26.8, high: 30.4

resolution: $\frac{0.1+30.4-18.3}{100} = 0.122$, modal value: 39236.

Comparison of modal values [number/sq deg/0.5 mag]:

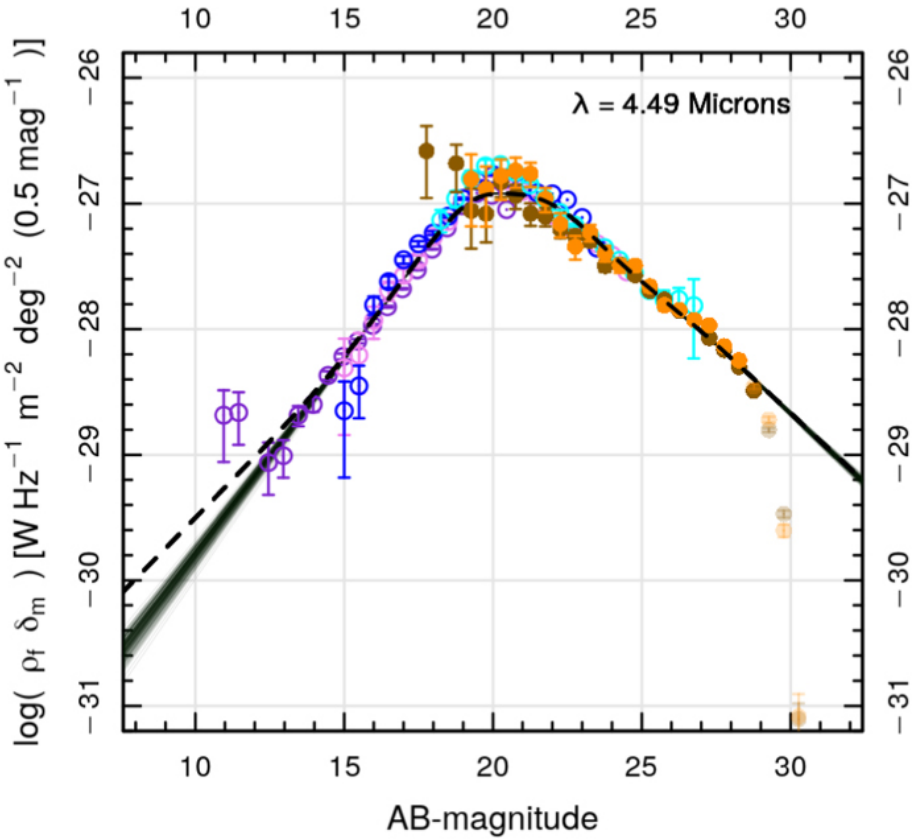
JWST: **~220 000** SDF: $\sim 39000 \cdot \frac{60'\times 60'}{30'\times 37'} \cdot \frac{0.5\text{ mag}}{0.122\text{ mag}} \approx$ **500 000**

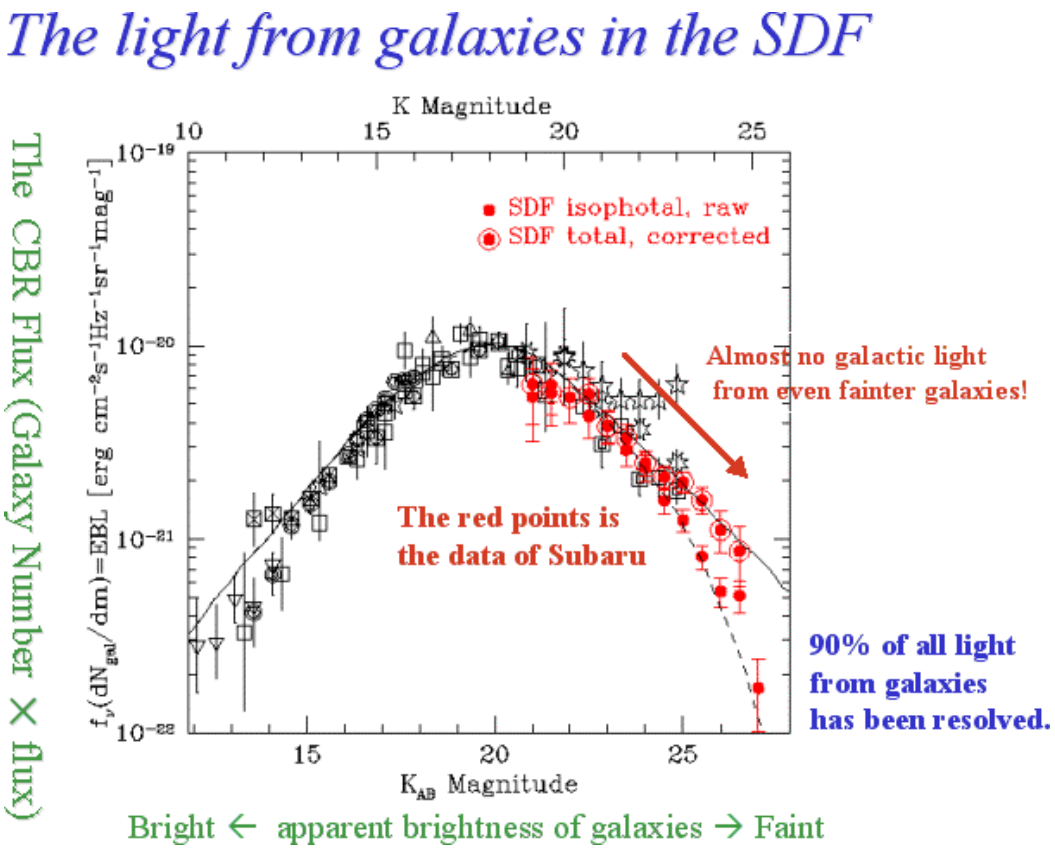
Totals: **JWST**: $\sim \mathbf{1.5\times 10^6}$/deg^2, **SDF**: $1.4\times 10^6 \cdot \frac{60'\times 60'}{30'\times 37'} \approx \mathbf{4.54\times 10^6}$/deg^2

HUDF: $10^4 \cdot \frac{60'\times 60'}{2.4'\times 2.4'} \approx \mathbf{6.25\times 10^6}$/deg^2; **JWST does not add anything new.**

Find the differences:

Part of fig.10 in JWST publ.:





$1\ \mathrm{W/m^2/Hz/deg^2/(½mag)} \approx 10^7 \cdot 10^{-4} \cdot 3282.8 \cdot 2 \approx 0.66 \times 10^7\ \mathrm{erg/s/cm^2/Hz/sr/mag.}$

New JWST info does not significantly deviate from SDF

(JWST: around *ecliptic* north pole, SDF: between Coma Berenices (*galactic* north pole) and Bootes)

∴ SDF, HUDF, & JWST all confirm 3-spherical cosmos.

SIMBAD[2]: relatively small sample: merely $388\,406$ out of $2\,046\,516$ galaxies have *redshift* AND *major axis* value (top/bottom cutoff of 5% eliminates extremes, leaving 349 562).

Up to a threshold, size increases with distance (like in SDF).

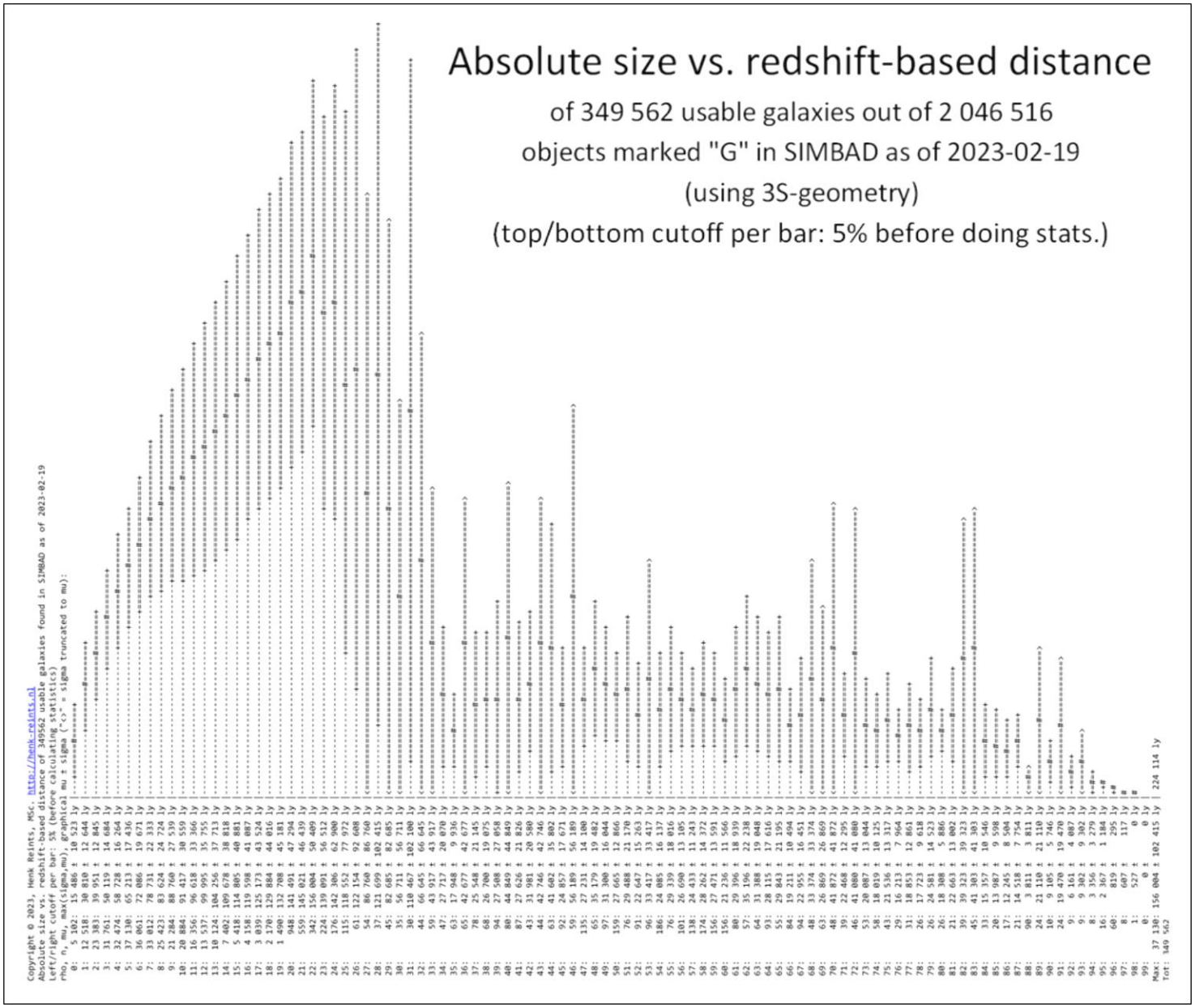
SDF: not an aselect sample, it *should* contain as few as possible nearby objects (SDF = Subaru ***Deep*** Field).

Presumption: SIMBAD holds "all we know", including many tiny galaxies (e.g. satellite galaxies like the Magellanic clouds) that are less distinguishable in deep space, making data set inhomogeneous.

For $r \gtrsim D_{\mathrm{H}}/3$ SIMBAD seems to hold a rather small sample size, but like in the SDF, deep space galaxies become smaller with increasing distance, in agreement with linear expansion ever since BB.

[2] https://simbad.u-strasbg.fr/simbad/

S I M B A D

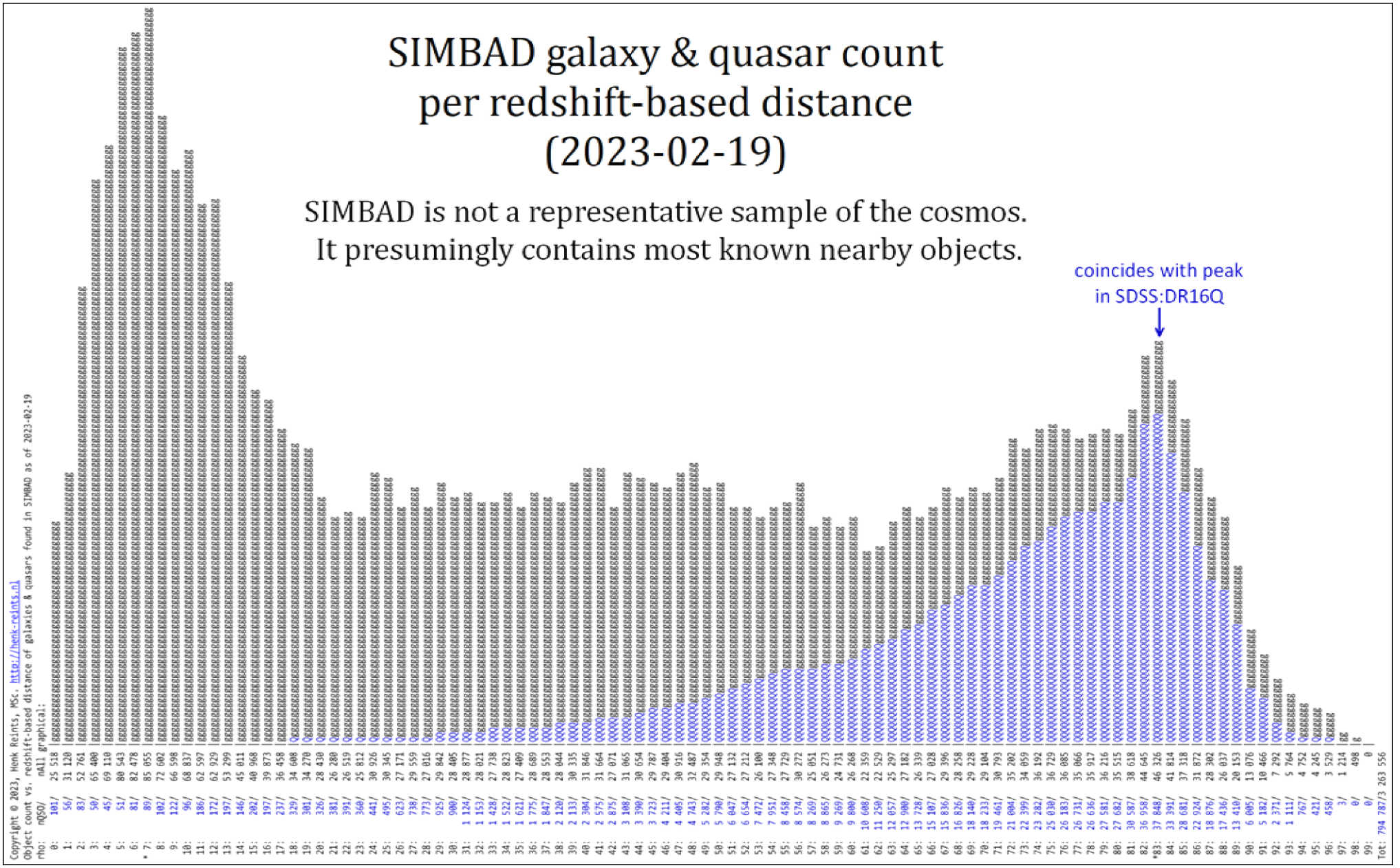


S I M B A D

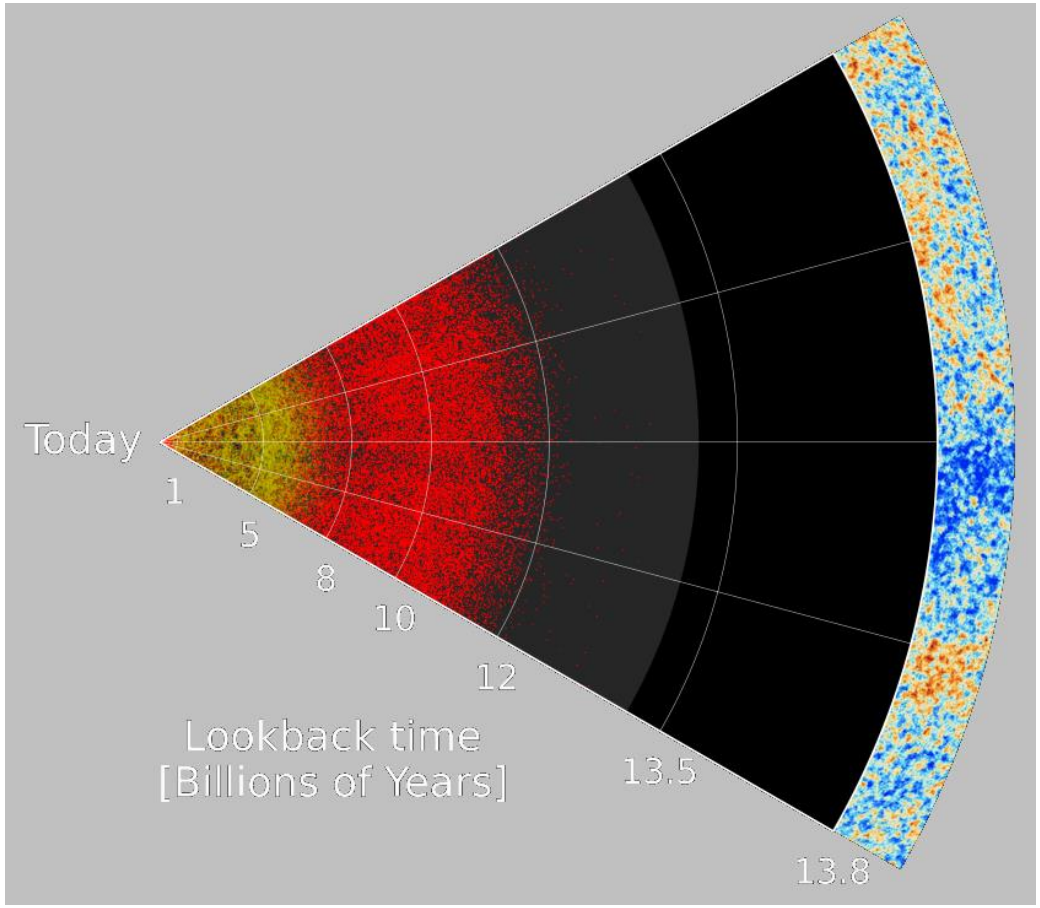
http://henk-reints.nl/astro/SIMBAD-Galaxies-20231014-SizeByDistanceByRedshift.txt
http://henk-reints.nl/astro/SIMBAD-Galaxies-20231014-SizeByDistanceByMagnitude.txt

SIMBAD galaxy & quasar count per redshift-based distance (2023-02-19)

SIMBAD is not a representative sample of the cosmos.
It presumingly contains most known nearby objects.



Sloan Digital Sky Survey:



Lookback time? Nope, proper distance!
And why not linear? Isn't c a constant?

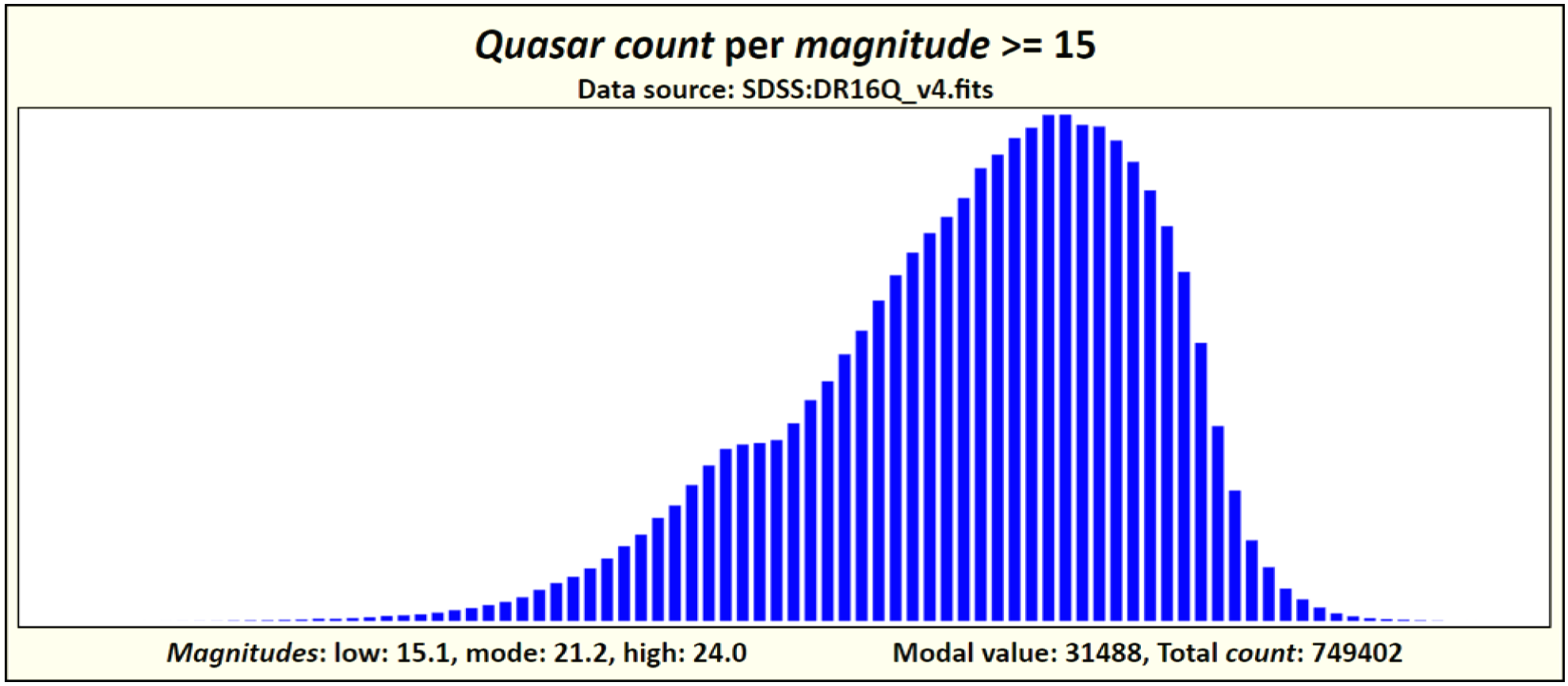
Image published May 2017
from:
DR12Q.fits (2014-12-18)
~297 000 quasars.

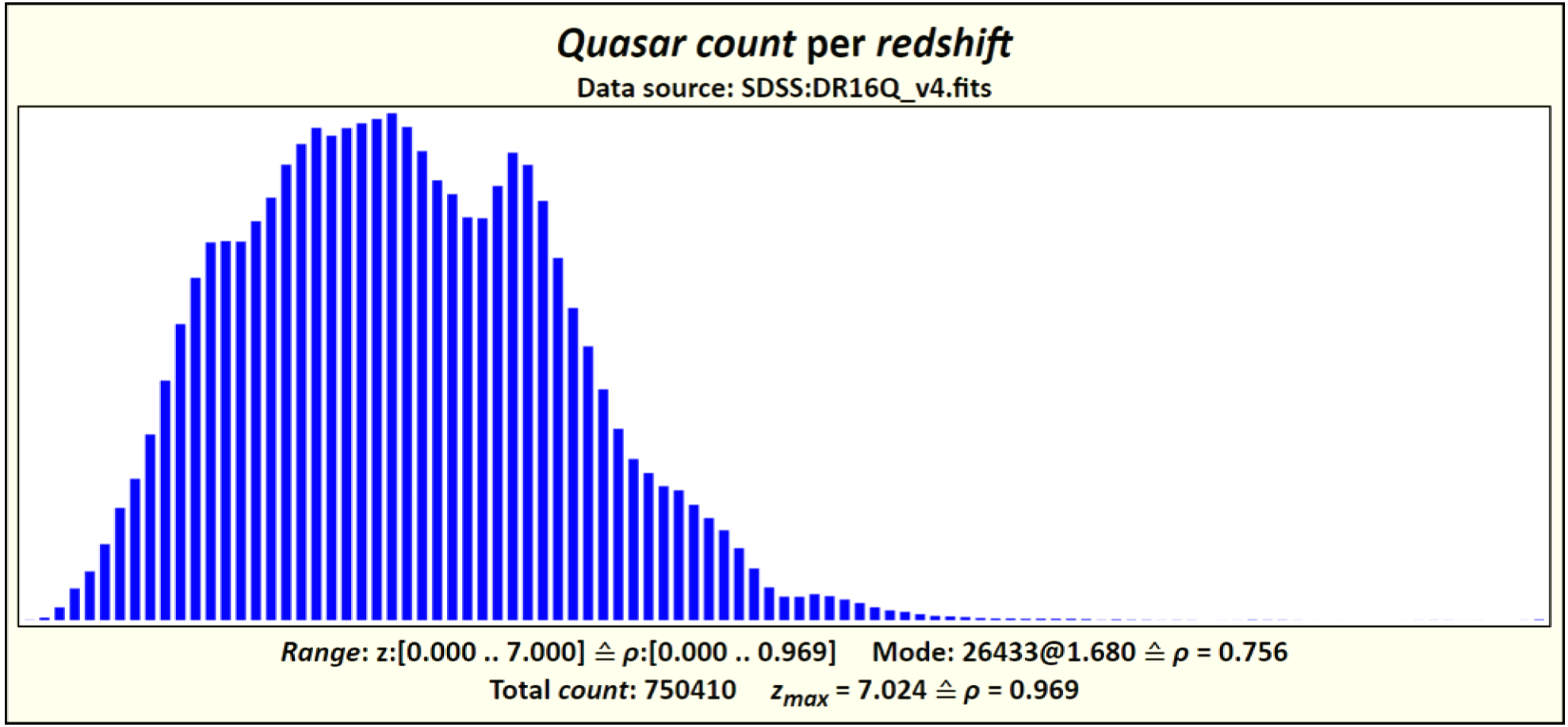
DR14Q_v4_4.fits (2017-12-08)
~526 000 quasars (~23% full sky).

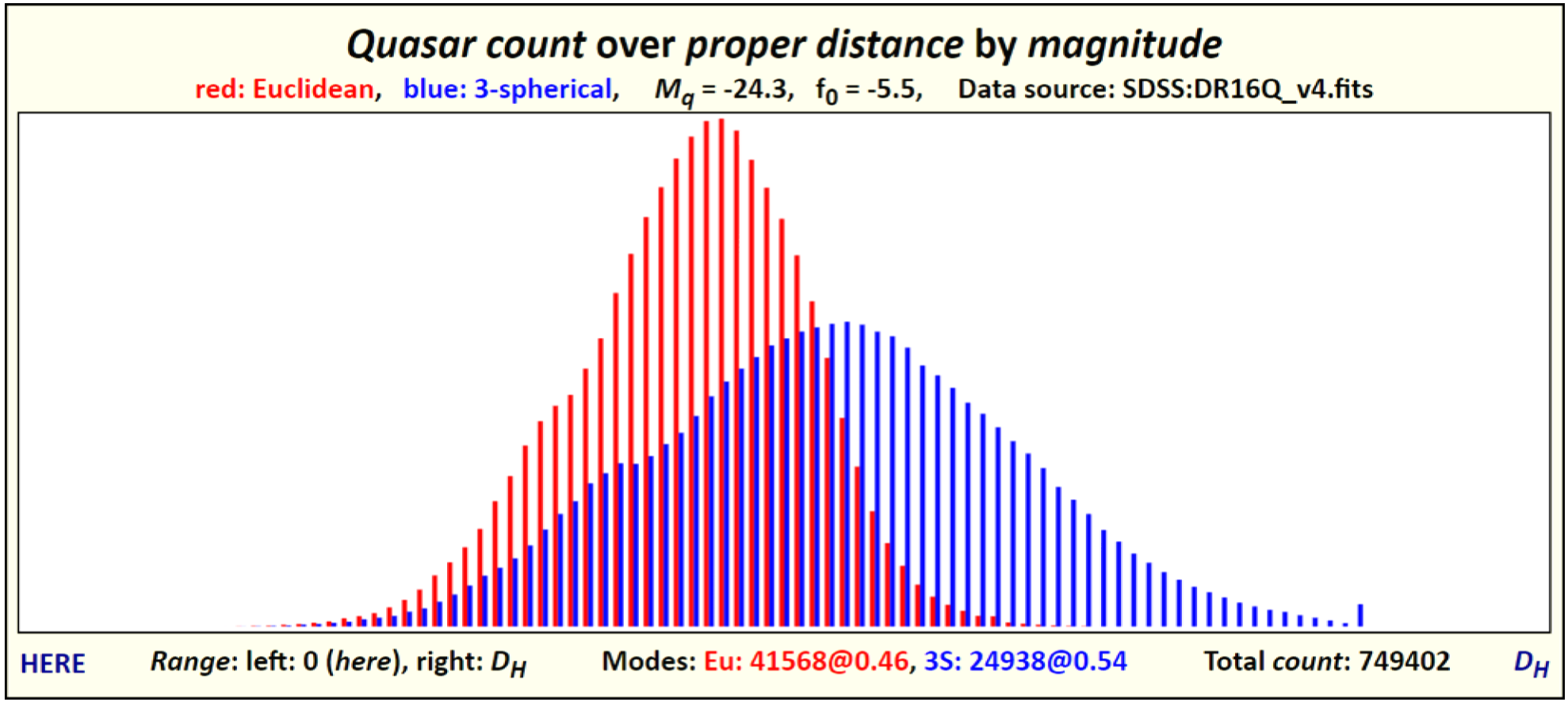
DR16Q_v4.fits[3] **(2020-07-08)**
~750 000 quasars.

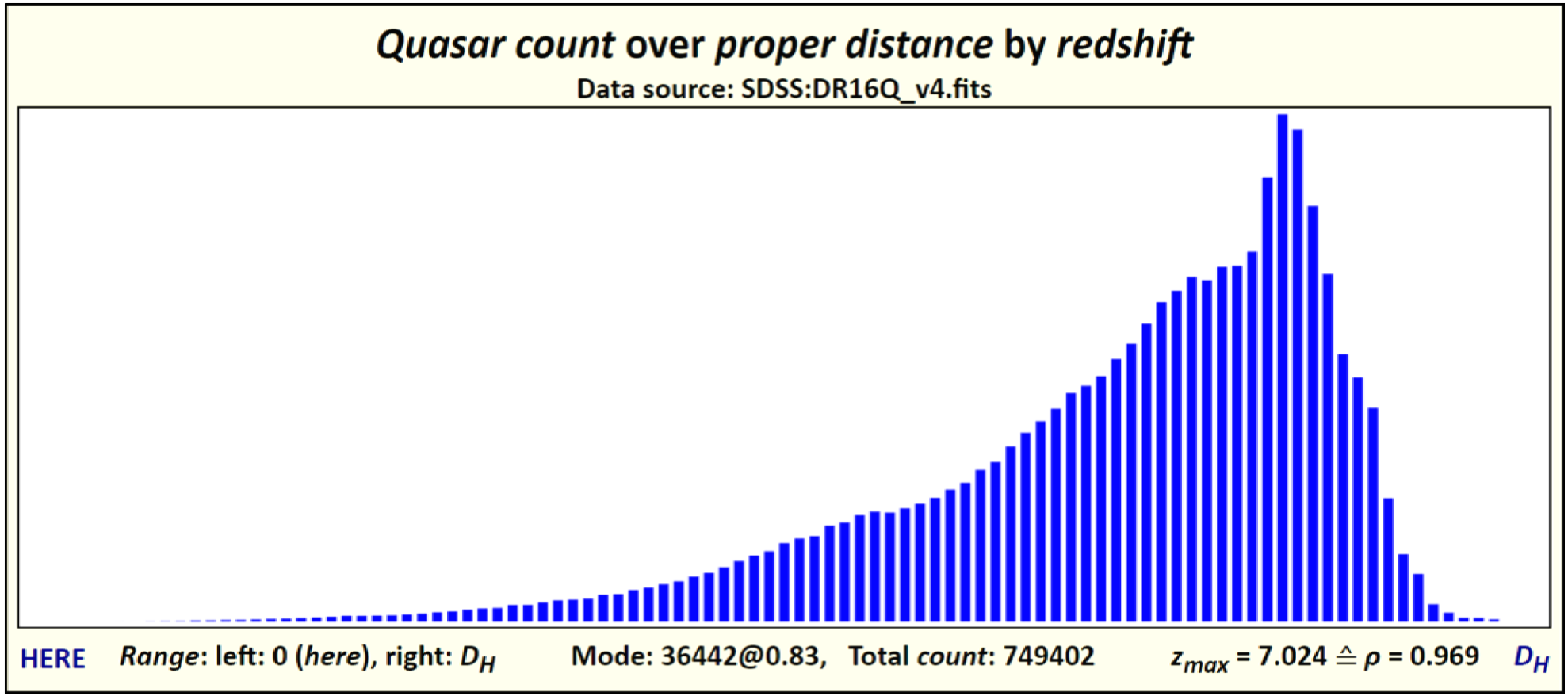
Magnitudes
& redshifts.

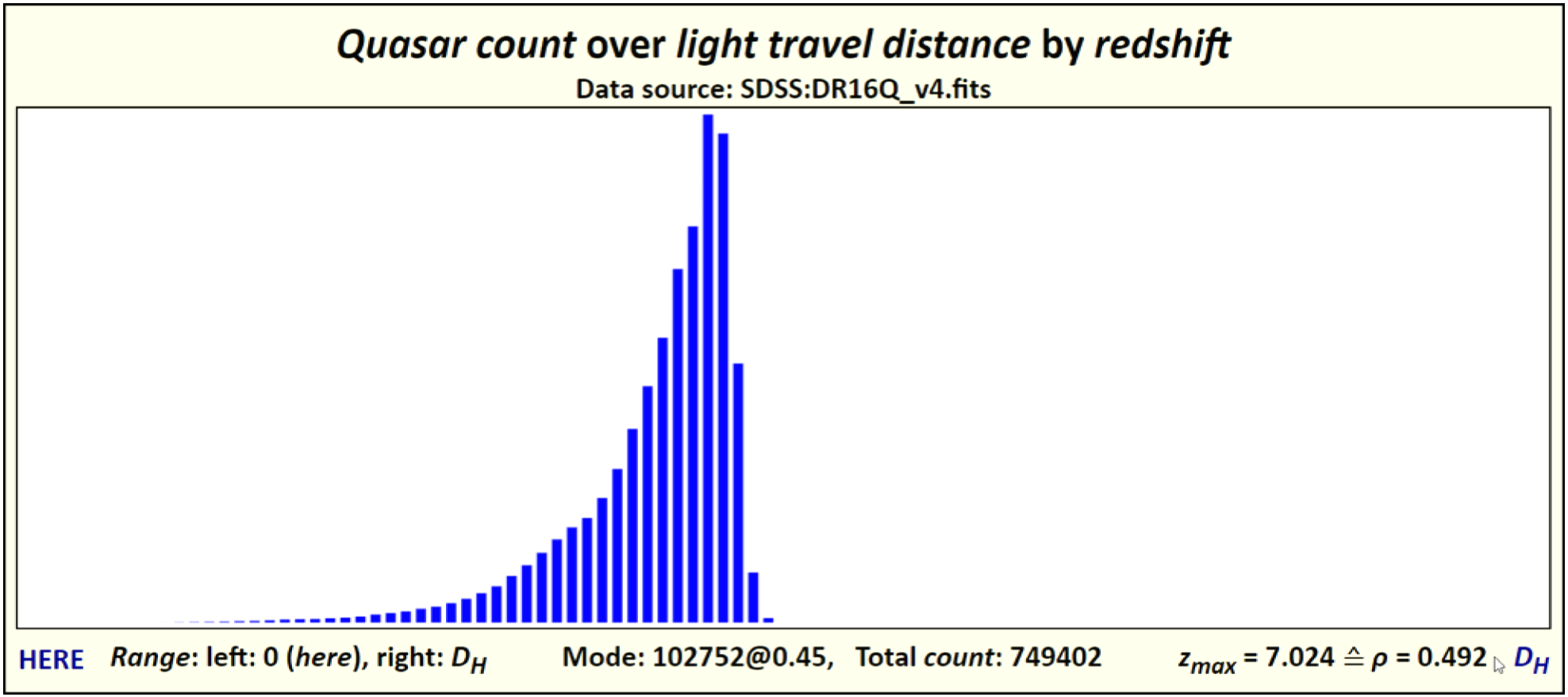
[3] https://dr18.sdss.org/sas/dr18/env/BOSS_QSO/DR16Q/DR16Q_v4.fits
as of 2023-11-17, DR18 still holds DR16Q: https://dr18.sdss.org/sas/dr18/env/BOSS_QSO/



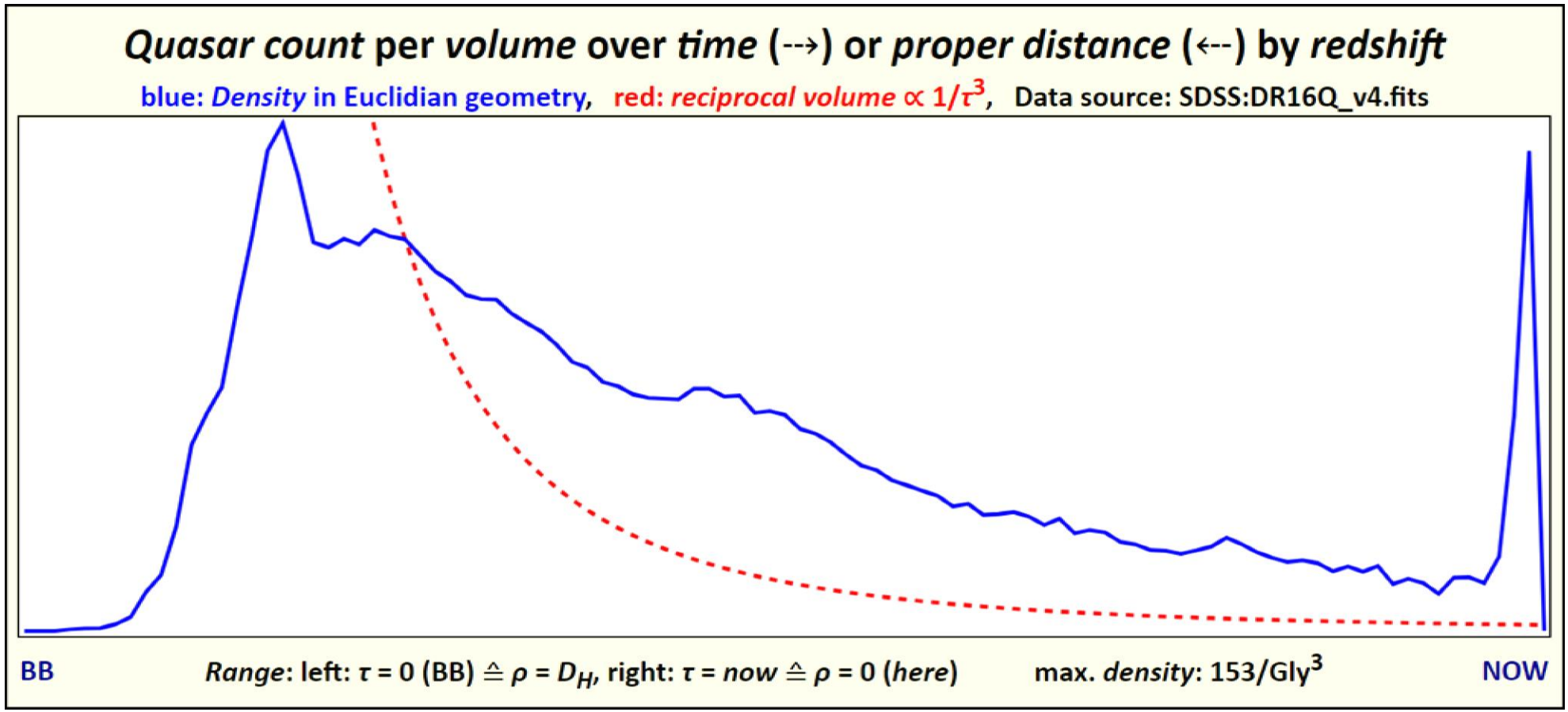








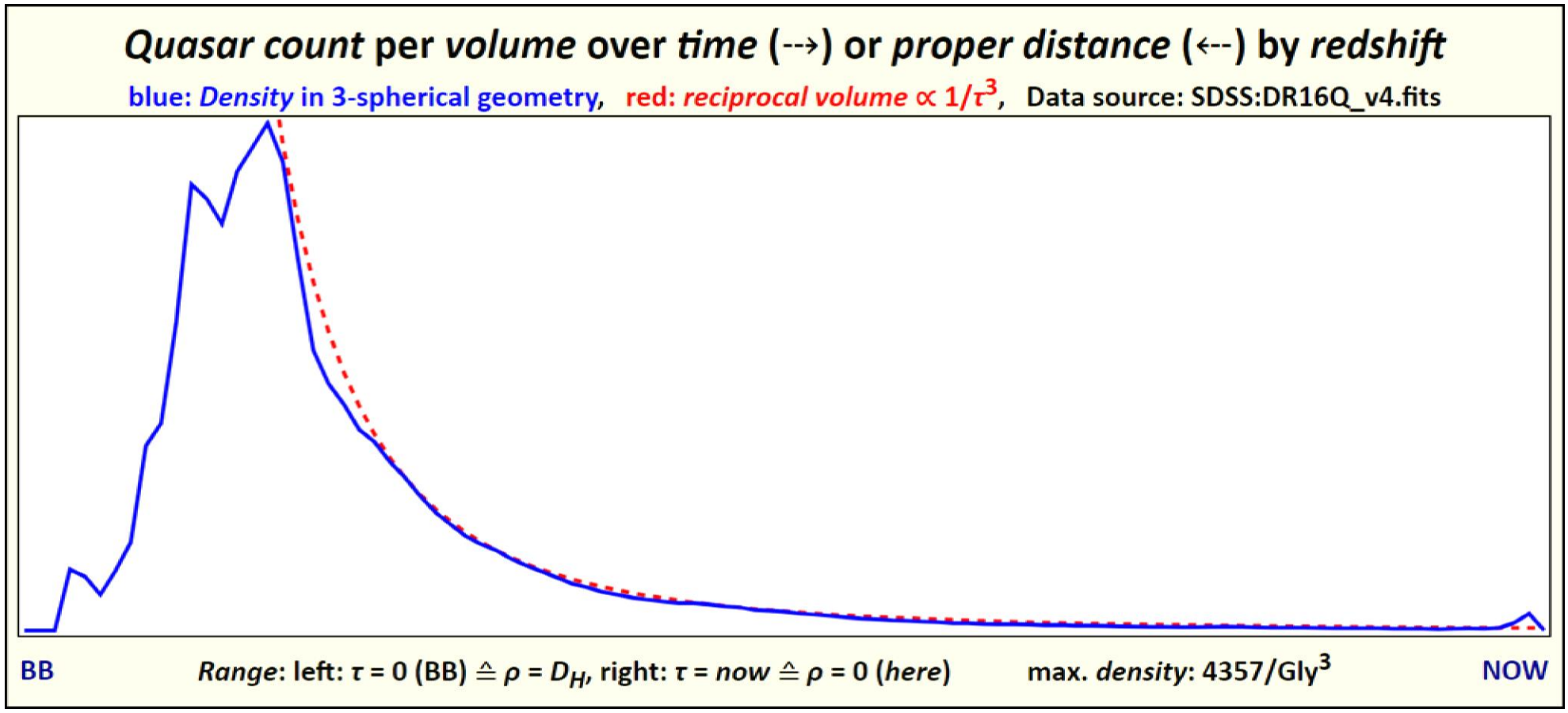
DR16Q count per volume over time, Euclidean:



Dashed curve: scaled reciprocal volume of linearly expanding universe.

It has not the slightest correspondance, no matter how it is scaled.

DR16Q count per volume over time, 3-spherical:



Dashed curve: scaled reciprocal volume of linearly expanding universe.

From $\tau \approx 0.2$ it nearly perfectly matches, right until today.

It essentially was *THIS* image (but based on DR12Q) that (on 2017-09-03, the day I was of exactly same age as my mother when se died & birthday of my grandma whom I was named after) first convinced me of the 3-sphericality of the cosmos.

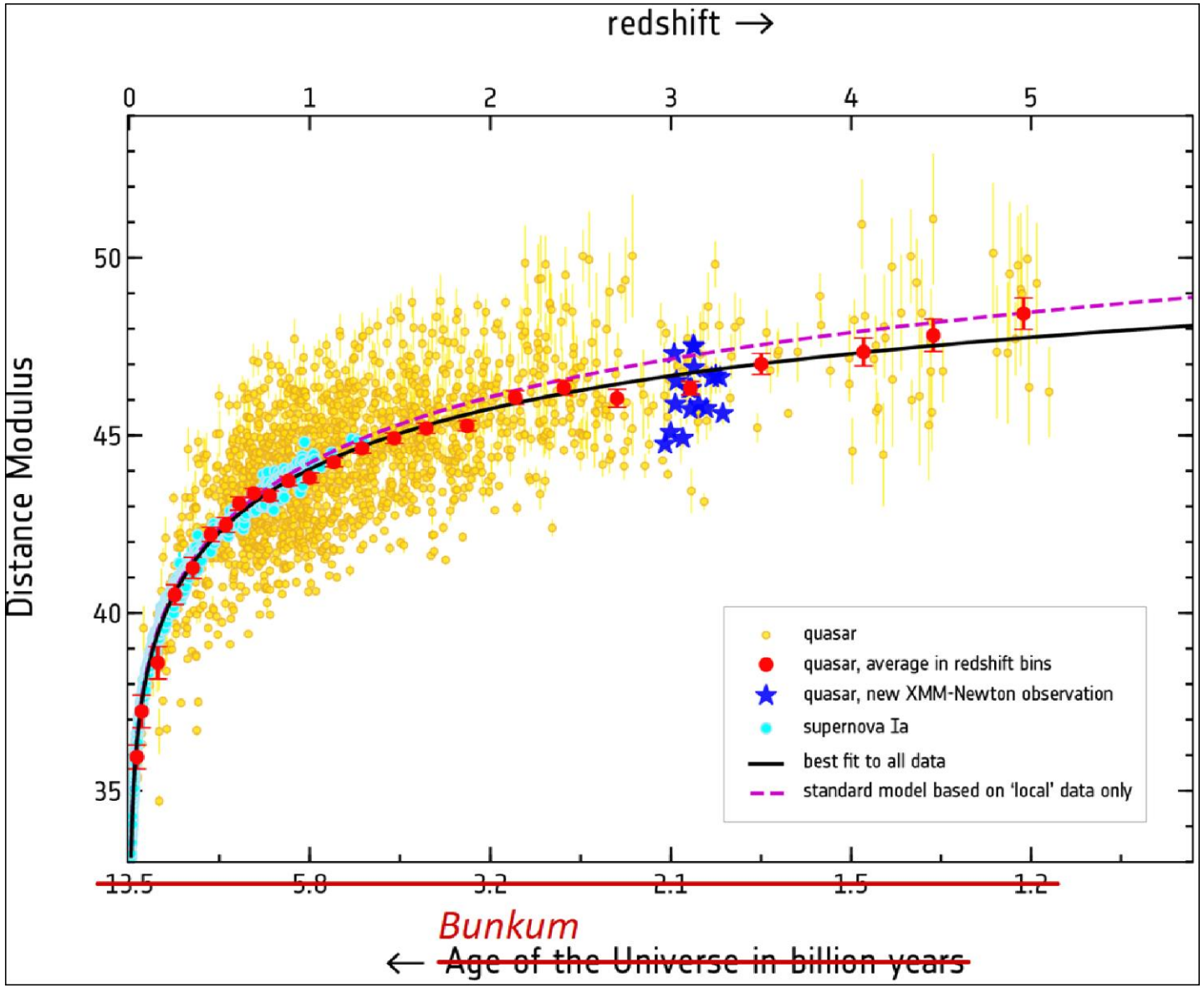


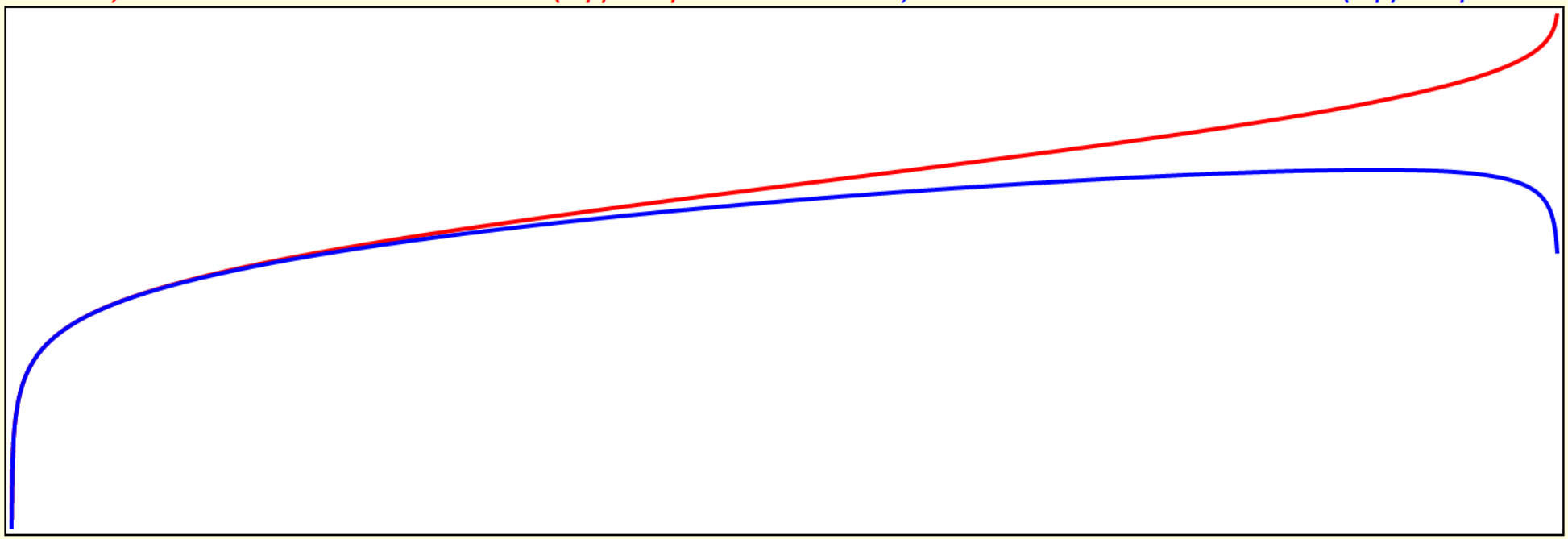
Fig. 19: Distance modulus versus redshift by Guido Risaliti & Elisabeta Lusso

http://www.esa.int/Our_Activities/Space_Science/Active_galaxies_point_to_new_physics_of_cosmic_expansion

Those two curves are very similar to:

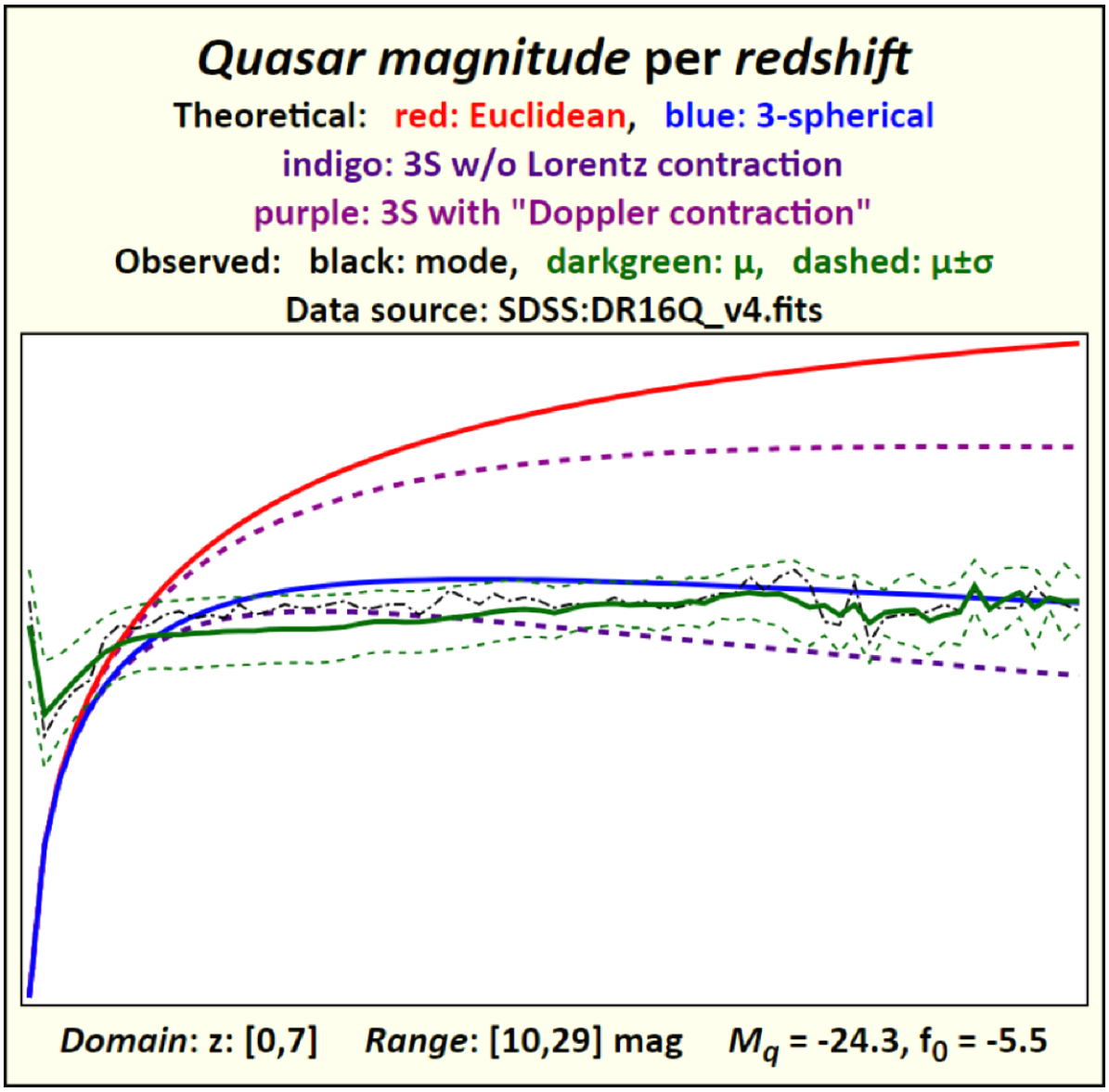
Attenuated Relativistic Distance Modulus, $f_0 = -5.5$

red: $\mu_{ar,Eu}(\rho) = -2.5 \log_{10}(e^{f_0 \arcsin \rho} \cdot \sqrt{(1-\rho)/(1+\rho)} \cdot A_{10pc}/A_{Eu})$, blue: $\mu_{ar,3S}(\rho) = -2.5 \log_{10}(e^{f_0 \arcsin \rho} \cdot \sqrt{(1-\rho)/(1+\rho)} \cdot A_{10pc}/A_{3S})$



HERE Domain(ρ): [0, D_H], Range: [23.2, 56.6], max($\mu_{ar,3S}$) = 46.4@0.882 D_H

Analysis of magnitude per redshift interval of *ALL* 749402 DR16Q objects yields:



Modes & $\mu \pm \sigma$ of apparent magnitudes per redshift interval, directly read from the DR16Q catalog.

No more than that.

~750 000 quasars.

The universe is definitely not Euclidean!

Ex obfervatis phænomenis immediate deductum eft & hypotheſes non finxi.

Saul Perlmutter, Adam G. Riess, & Brian P. Schmidt (all et al.)

did **NOT** ***discover*** but ***invent*** accelerated expansion[4].

Sir Isaac Newton:

*Cauſas rerum naturalium non plures admitti debere, quam quæ & **veræ** ſint & (...).*

No more causes of natural things should be allowed than** [known] **TRUTHS!

Antoine de Lavoisier:

*Ideas should be only something that immediately **follows** from an observation.*

HR: ***do NOT concoct an underlying cause!***

[4] 2011 Nobel Prize in Physics.

Accelerated expansion cannot be deduced from ascertained truths, so it most plausibly ***does not exist***.

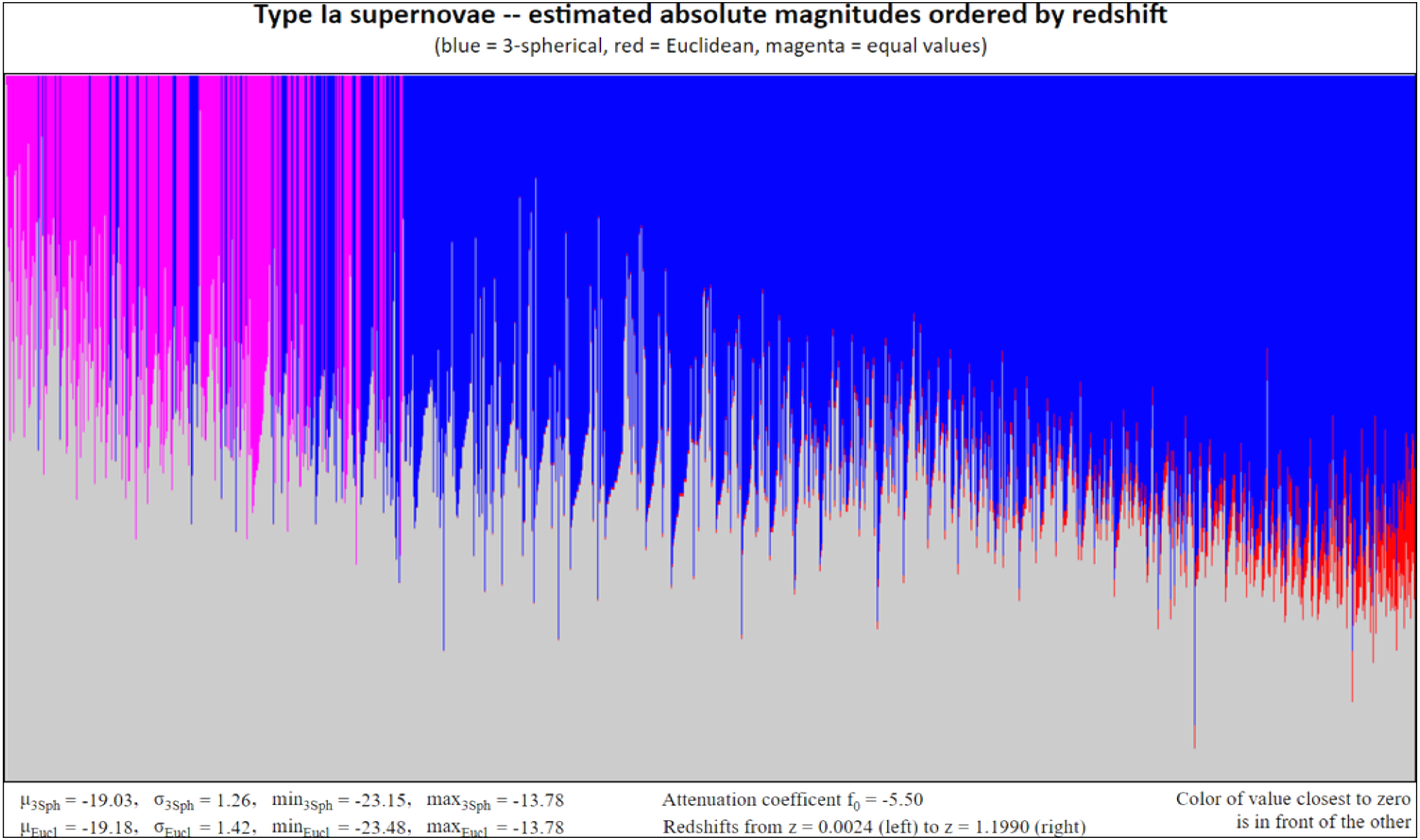
Expansion = growth of Hubble distance at very *speed of light* (a true constant, see page 6), **FULL STOP!**

They actually discovered the three-sphericality of the universe,

congratulations! 

But the flawed idee fixe of a flat universe prevented them to even faintly consider it.

1499 type Ia supernovae from http://www.cbat.eps.harvard.edu/lists/Supernovae.html
as of 2018-06-13, supplemented with details from SIMBAD as of 2020-09-24:



They

☺ **DISCOVERED**:
discrepancy between apparent magnitudes
and redshifts of distant Type Ia supernovae;

☹ **INVENTED**:
accelerated expansion of the universe as its cause;

☹ **CONCOCTED**:
dark energy, **picked from ~~thin air~~ empty space**,
in an attempt to "explain" *accelerated expansion*.

Double violation violation of:

Newton, Regula Philosophanda I.:
Cauſas rerum naturalium non plures admitti debere, quam quæ veræ ſint.
No more causes of natural things should be allowed than truths.

Neither *A.E.* nor *D.E.* were an already known truth.

Summary:

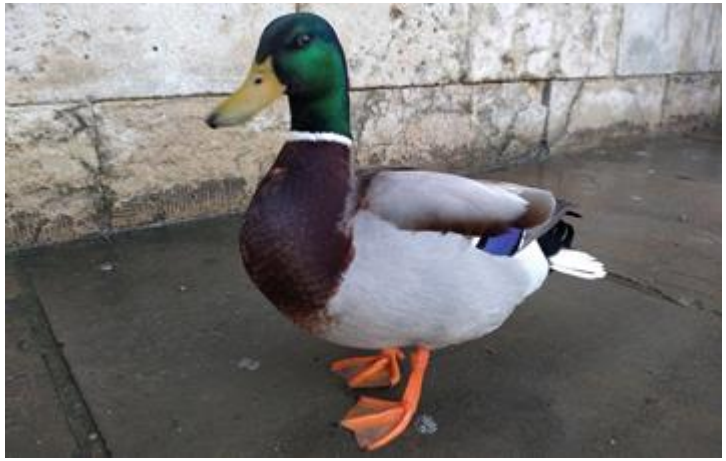
- Both the SDF (1.4 mln. obj.) and DR16Q (750 000) reveal that the universe is a glome and nothing else.
- Its hyper radius growing at c/π is not Minkowski's ict coordinate, so not an aspect of Einstein's ~~theory~~ conclusion of general relativity.
- Its antipodal distance equals the Hubble distance.
- The CMB source is a small entity around the antipodal point.
- Together, the 3-spherical SDF object size over time and the 3-spherical quasar count per volume over time clearly show that the universe has expanded as linearly as can be ever since the big bang.

& **Like the barycentre of Earth's surface not residing anywhere at this very surface, the barycentre of the universe is nowhere within it.**

Ex obſervatis phænomenis deductum eſt
& hypotheſes non finxi.

It swims like

it walks like



it ♡ like

and it

The universe is a 3-sphere.

NOT just some ***VISION***!

CONCLUSION from rock-hard ***FACTS***!

Ex obſervatis phænomenis deductum eſt
& hypotheſes non finxi.

Comparison of distance modulus and surface area of ball around us in Euclidean and 3-spherical geometry:

z	beta	description	mu3S -muE	3S gain lumFctr	muE	mu3S	surface of ball (E-3S)/3S	(3S-E)/E
0.01	0.010		-0.0	1.0	33.2	33.2	0.0%	-0.0%
0.02	0.020		-0.0	1.0	34.8	34.7	0.1%	-0.1%
0.03	0.030		-0.0	1.0	35.7	35.7	0.3%	-0.3%
0.04	0.039		-0.0	1.0	36.4	36.4	0.5%	-0.5%
0.05	0.049		-0.0	1.0	36.9	36.9	0.8%	-0.8%
0.05567	0.054	BH 2: Holmberg 15A	-0.0	1.0	37.2	37.2	1.0%	-1.0%
0.06	0.058		-0.0	1.0	37.4	37.4	1.1%	-1.1%
0.07	0.068		-0.0	1.0	37.8	37.7	1.5%	-1.5%
0.0777	0.075	BH 3: IC 1101	-0.0	1.0	38.0	38.0	1.9%	-1.8%
0.08	0.077		-0.0	1.0	38.1	38.1	2.0%	-1.9%
0.09	0.086		-0.0	1.0	38.4	38.4	2.5%	-2.4%
0.1	0.095		-0.0	1.0	38.7	38.7	3.0%	-2.9%
0.2	**0.180**		**-0.1**	**1.1**	40.7	40.6	11.4%	-10.3%
0.3	0.257		-0.2	1.2	42.0	41.8	24.8%	-19.9%
0.4	0.324		-0.4	1.4	43.0	42.6	43.2%	-30.2%
0.5	0.385		-0.6	1.7	43.9	43.3	67.0%	-40.1%
0.6	0.438		-0.7	2.0	44.6	43.8	96.8%	-49.2%
0.7	**0.486**		-0.9	2.3	45.2	44.2	**133 %**	**-57.2%**
0.8	**0.528**		**-1.1**	2.8	45.7	44.6	178 %	-64.0%
0.9	0.566		-1.3	3.3	46.2	44.9	230 %	-69.7%
1	0.600		-1.5	3.9	46.6	45.1	293 %	-74.5%
2	0.800		-3.2	18.3	49.4	46.2	1.7e3%	-94.5%
2.219	0.824	BH 1: Tonantzintla 618	-3.5	24.3	49.8	46.3	2.3e3%	-95.9%
3	0.882		-4.4	58.9	50.8	46.4	5.8e3%	-98.3%
3.366	0.900	BH 4: S5 0014+81	-4.8	84.3	51.2	46.4	8.3e3%	-98.8%
4	0.923		-5.4	146.8	51.7	46.3	1.5e4%	-99.3%
4.692	0.940	BH 5: SMSS J215728.21-360215.1	-6.0	249.4	52.2	46.2	2.5e4%	-99.6%
5	0.946		-6.2	309.2	52.4	46.1	3.1e4%	-99.7%
→ +∞	→ 1		→ −∞	→ +∞	→ +∞	→ −∞	→ +∞	-100.0%

Black hole top 5 from https://en.wikipedia.org/wiki/List_of_most_massive_black_holes as of 2021-07-26.

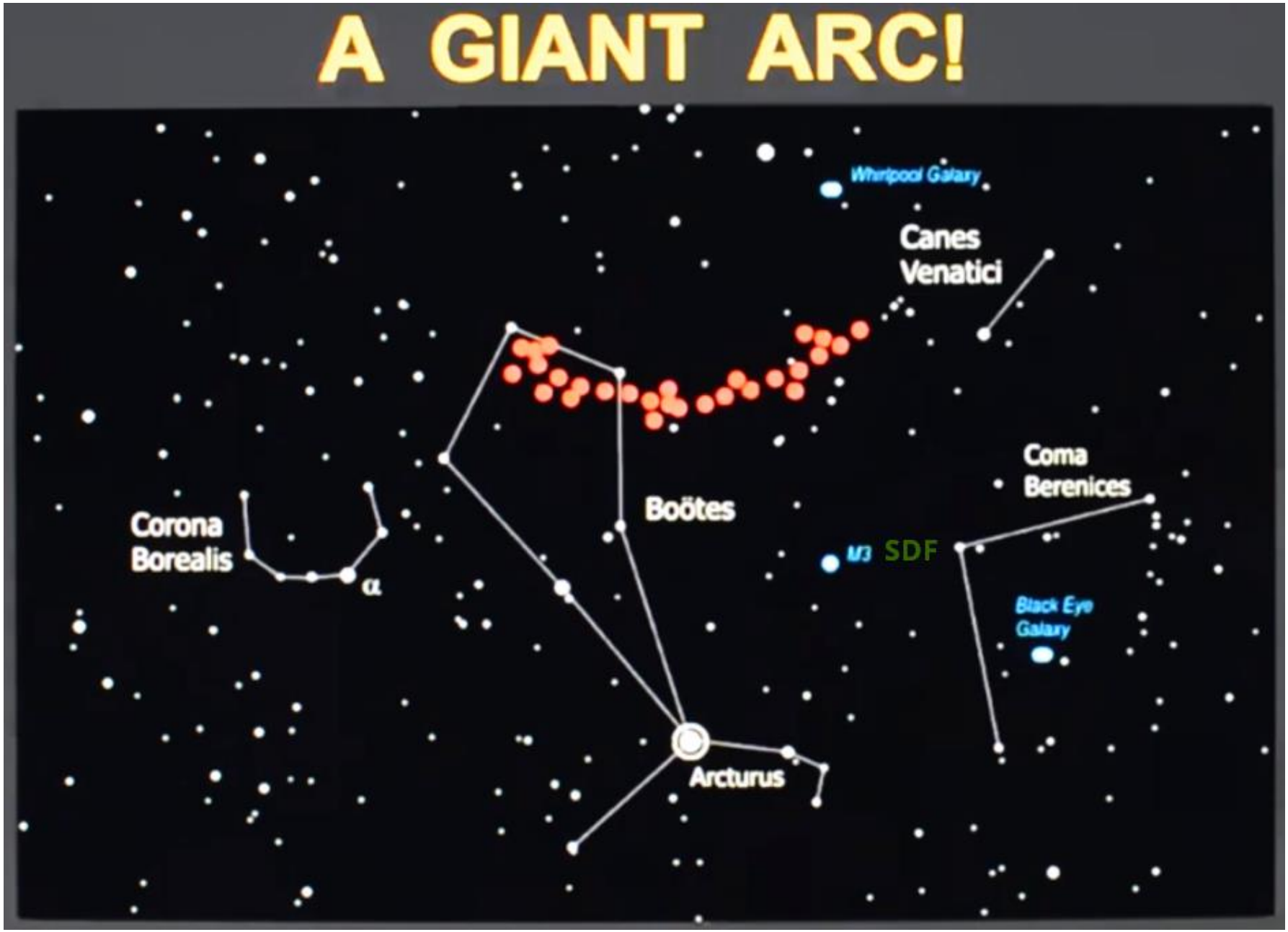
derivations of numbers & equations

about the cosmos must be redone

using 3-spherical geometry!

EACH and EVERY!

Of course not the ascertained truths themselves, such as measured data, nor any properly derived laws of nature.



The "Giant Arc":

https://youtu.be/DXtmRRXTiSw http://www.star.uclan.ac.uk/~alopez/

https://youtu.be/DXtmRRXTiSw?t=187 : **3.3** bln. light years long,
9.2 bln. light years away;

https://youtu.be/DXtmRRXTiSw?t=240 : "spans 10 degrees on the sky".

Uhh... $3.3/9.2 \approx 0.36$ rad $\approx 21°$

IF this 9.2 Gly is based on $\Lambda\mathrm{CDM}$: $z \approx 1.443$

Correct H-L:	*our* frame:	curr. proper dist.:	0.713	~9.82 Gly
		obs. dist. = lgt. trav. dist.:	0.416	~5.73 Gly
		lgt. trav. time = lookback:	0.416	~5.73 Ga
time dilation:	*its* frame:	proper lookback time:	0.170	~2.35 Ga
		proper age = obs. age:	0.830	~11.4 Ga

3S geom.: angular size of $10° \implies$ absolute size: ~0.60 Gly
with a factor of 2 (i.e. 21°/"spans 10 degrees"): ~**1.20** Gly

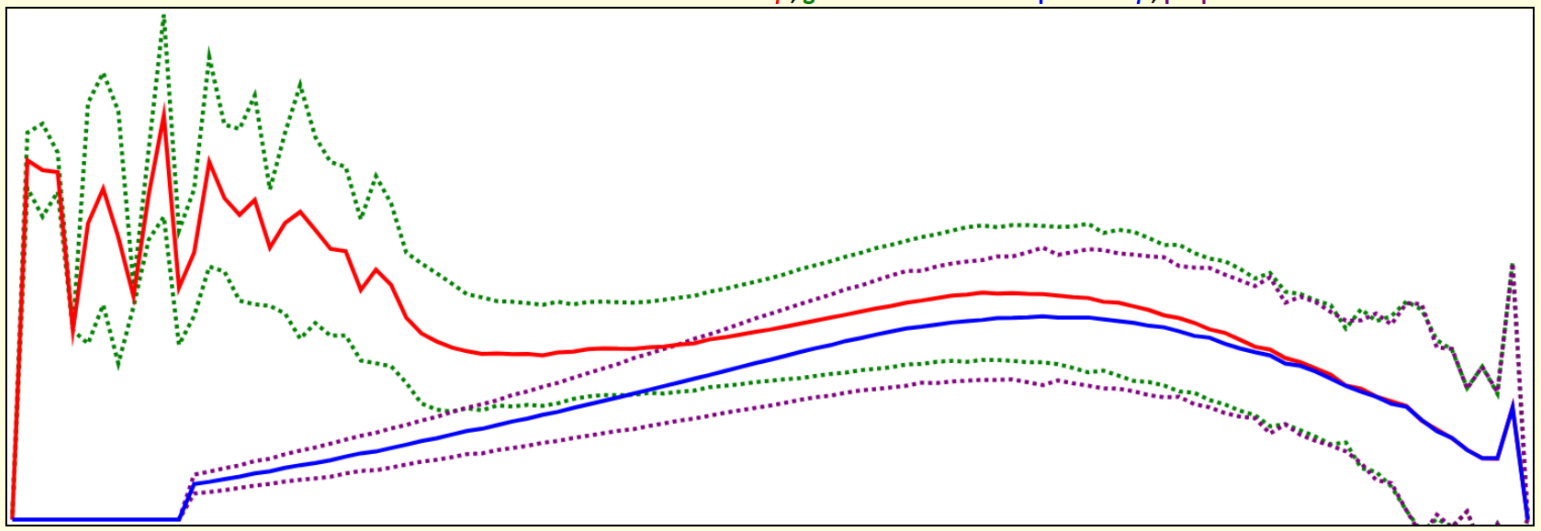
IF $\beta = 9.2/13.77 \therefore z = \sqrt{(1+\beta)/(1-\beta)} - 1 \approx 1.242$

yielding: 9.2, 5.52, 5.52; 2.46, 11.3; 0.66, 1.32

LINEAR from BB EXPANSION

Comparison of absolute galaxy *sizes* over *time* or *distance* in the Subaru Deep Field

Calculated from observed *sizes* red: Euclidean: μ, green: $\pm1\sigma$ blue: 3-spherical: μ, purple: $\pm1\sigma$

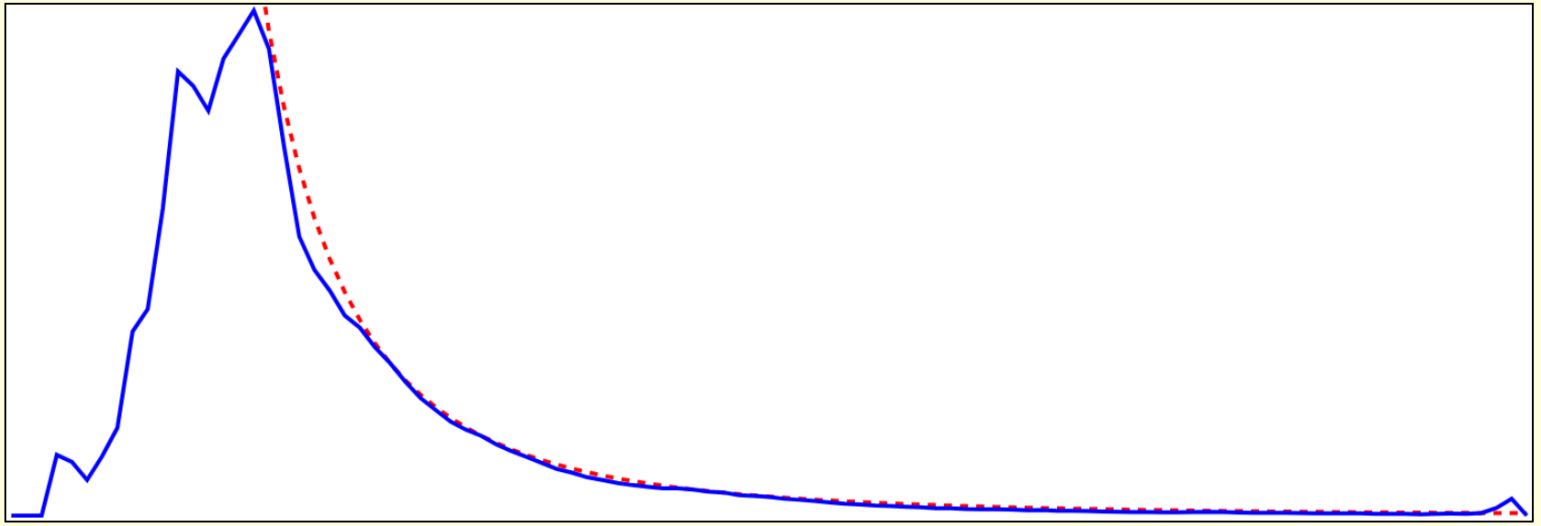


D_H BB — ρ = *distance* from 0 (right edge) to 1 = *Hubble distance* (left edge), calculated from *magnitude* using M_g = -18 and f_0 = -5.5 (too dim galaxies ignored in 3-sph.) HERE NOW

3-spherical has maximum of 23411 ly at ρ = 0.32 Euclidian has local minimum of 18920 ly at ρ = 0.65, *count* beyond = 9537

Quasar count per *volume* over *time* (⇢) or *proper distance* (⇠) by *redshift*

blue: *Density* in 3-spherical geometry, red: *reciprocal volume* $\propto 1/\tau^3$, Data source: SDSS:DR16Q_v4.fits



BB *Range*: left: τ = 0 (BB) ≙ $\rho = D_H$, right: τ = *now* ≙ ρ = 0 (*here*) max. *density*: 4357/Gly^3 NOW

LINEAR EXPANSION up to *NOW*

Expansion was **LINEAR** from Big Bang until right ***NOW***!

NO inflationary universe!

(Worst concoction I've ever seen, deduced from completely nothing at all!).

NO accelerated expansion!

∴ ***NO*** dark energy!

Ex obſervatis phænomenis deductum eſt
& hypotheſes non finxi.

Einstein concluded everything from (facts of) *experience*, except the **cosmological constant**, which he **picked from thin air** in an attempt to "explain" the *assumption* of a static universe.

After *observations* (i.e. *experience*) showed the universe is not static at all, he called this *fabrication* his **greatest blunder**.

And now Einstein's one and only ***concoction*** has been revived in order to "explain" the *presumed* (but misconceived) acceleration of the expansion of the universe, which is *exactly the opposite of what* Λ *was meant for*...

How clever can one be?

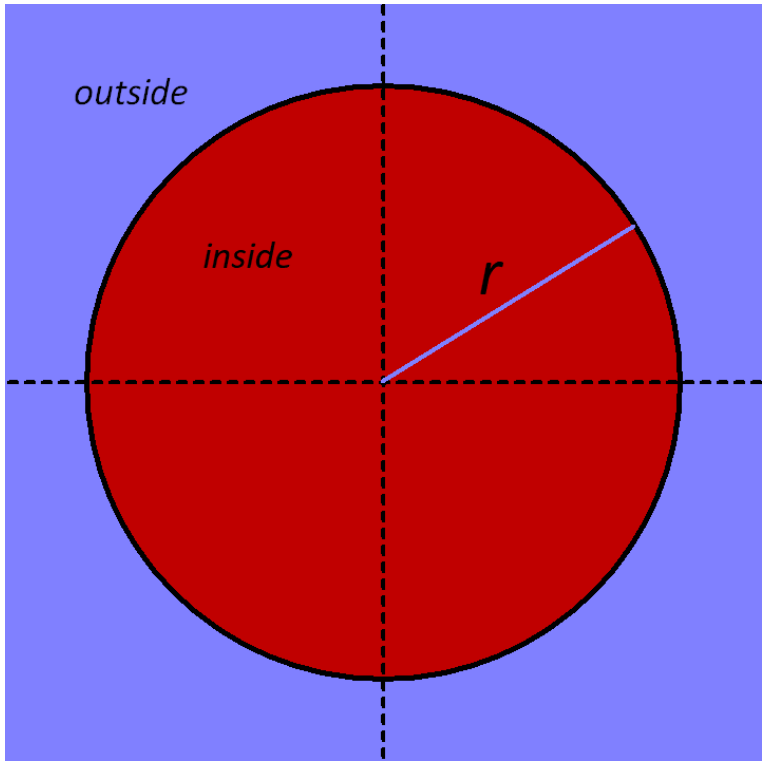
If rational thought thinks itself out to a conclusion, it arrives at something non-rational.

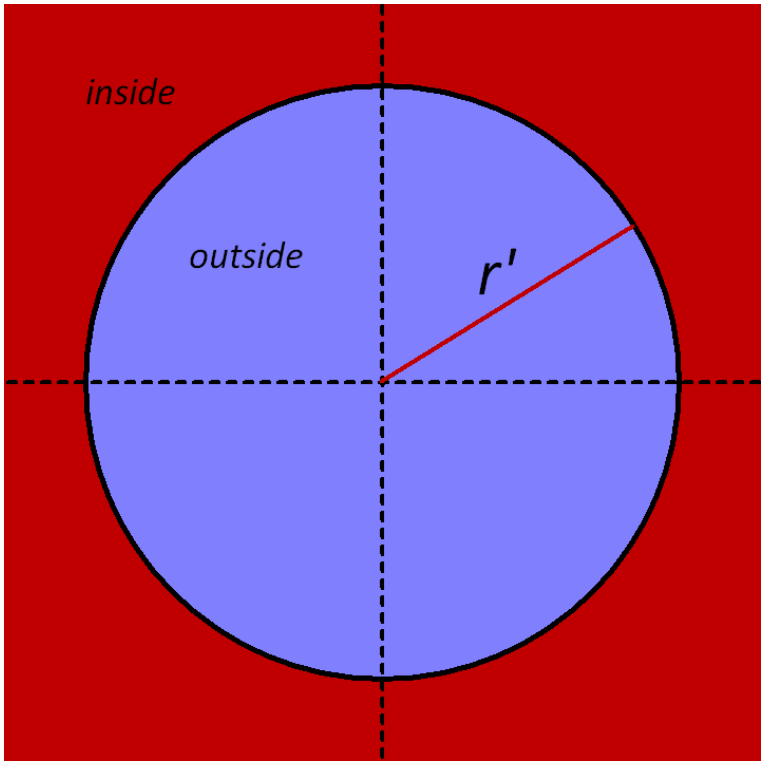
https://en.wikiquote.org/wiki/Albert_Schweitzer

Concave or convex?

Inside/outside of unit circle, sphere, glome:

Turn inside out via transformation: $r' = 1/r$





Akin to chirality?

Where is the centre? Where is infinity?

Mundus glomus est.

The universe is a glome.

Where does this thread lead us?

THE DEATH OF THE MINOTAUR!

Black-figure amphora depicting Theseus fighting Minotaur.
Attributed to the Painter of the Birth of Athena.
Louvre Museum, Greek Archaic Age (600-480 BCE).
De Agostini Picture Library / Getty Images Plus
https://www.thoughtco.com/minotaur-4767220

Λarry Cook[5]'s Delusive Monstrosity

Λ? ***No*** accelerated expansion,
hence ***no*** cosmological constant!

Cold Dark Matter?

Please see http://henk-reints.nl/astro/HR-Dark-matter-slideshow.pdf

[5] Sounds like Dutch *lariekoek*, meaning *gobbledygook, malarkey*.

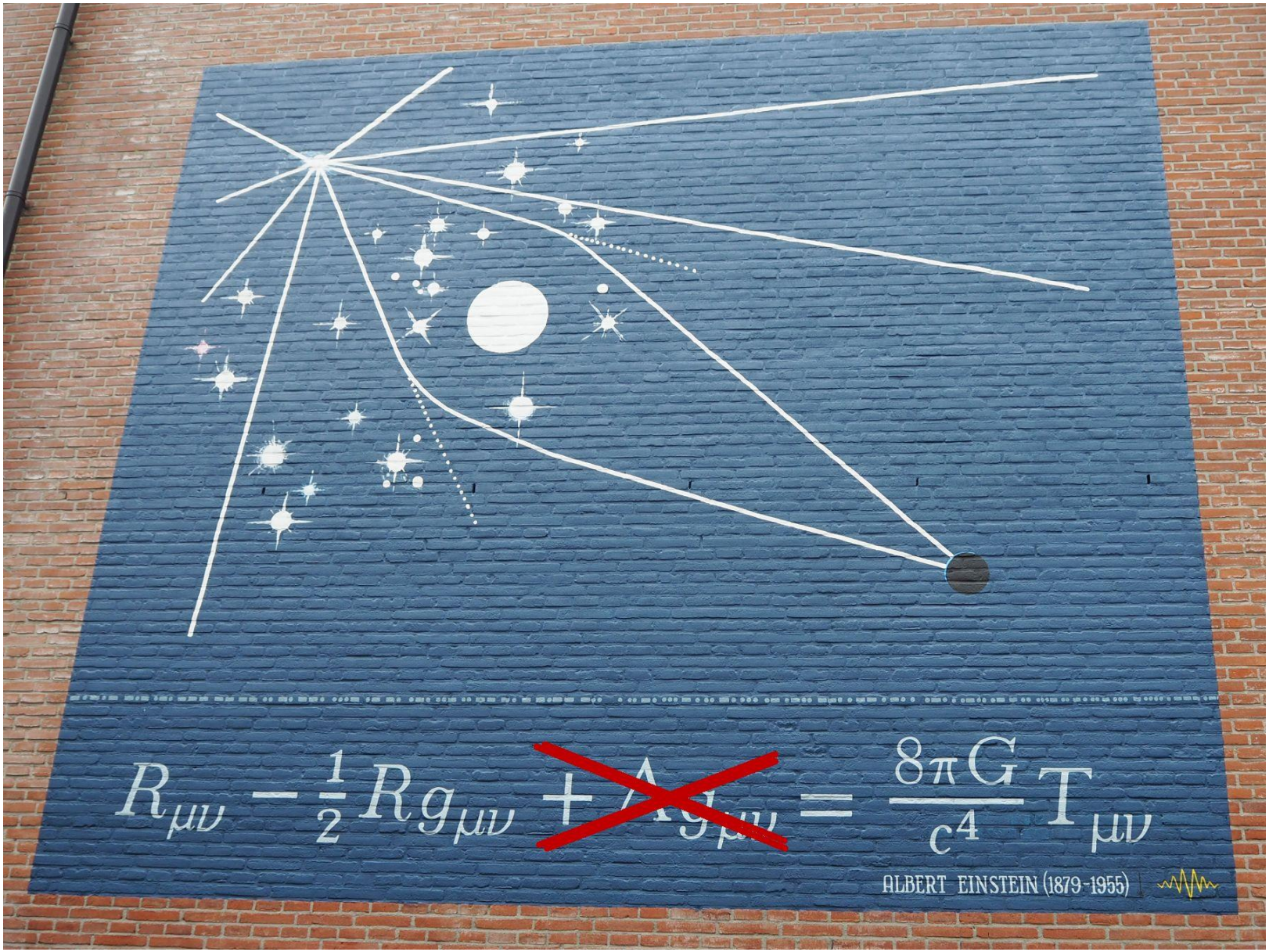
ΛCDM:

Silly &

Highly

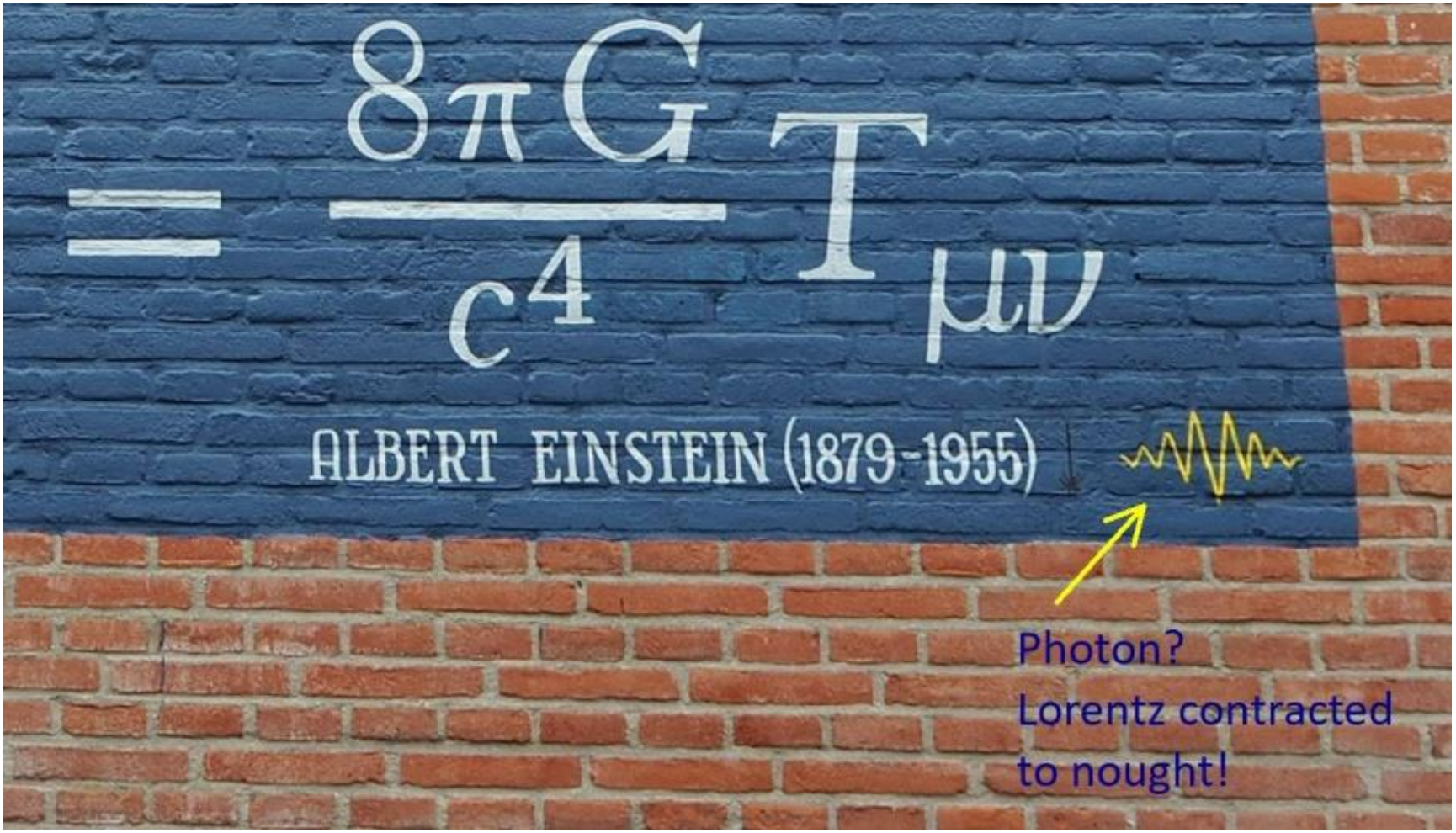
Inconsistent

Theory.

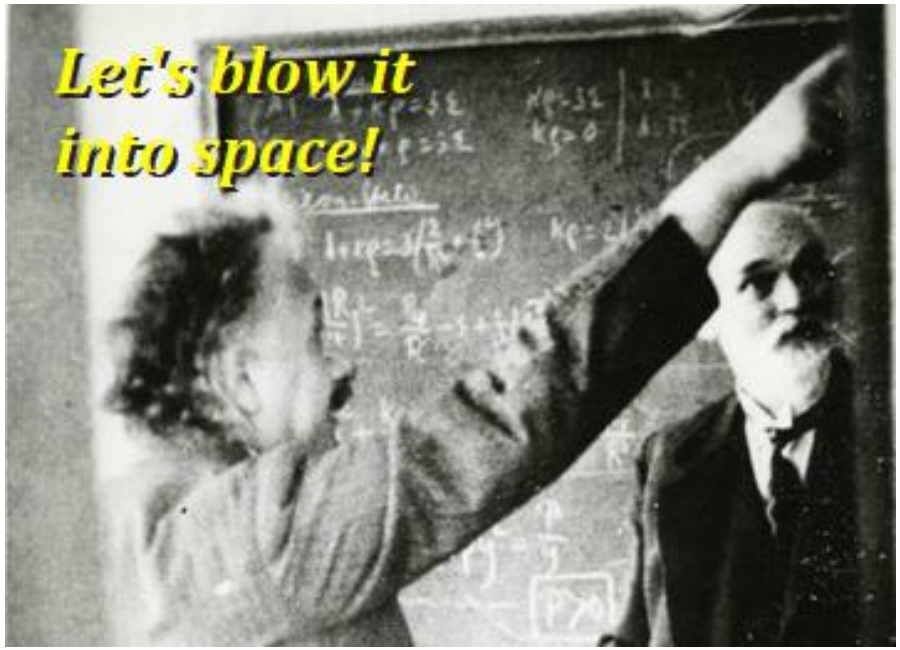


Rijksmuseum Boerhaave, Lange Sint Agnietenstraat 10, Leiden (NL)

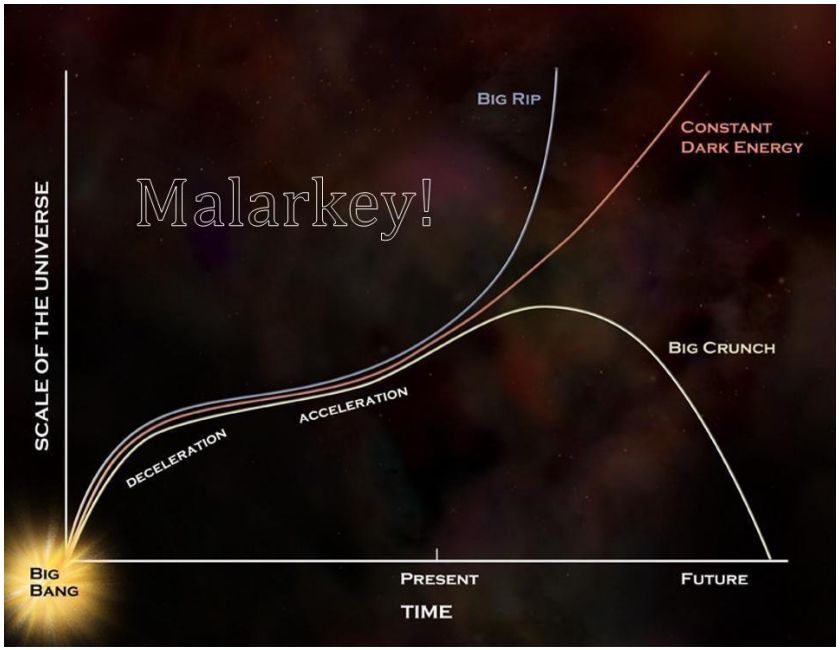
And what about this:



(I'm not blaming Einstein himself)



Einstein & De Sitter



Truth: straight line through origin.

Ex obſervatis phænomenis deductum eſt:

The universe is a 3-sphere that has expanded as linearly as can be, right from the very beginning until now.

Hypotheſes non finxi.

~~Dark matter~~, ~~dark energy~~, ~~cosmological constant~~, ~~other nonsense~~.

Barycentre not within universe → universe ≠ black hole

(senseless to consider, & universe = glome, so nothing can get out anyway)

yet it *does* have a Schwarzschild distance: $D_S = \frac{2GM_U}{c^2}$

Cosmological principle ⇒ no overlap/hole ⇒

just one and only one distance can be characteristic.

Both D_S and D_H directly related to speed of light (limit).

Must be: $D_S = D_H \quad (= D_{AP})$

i.e.: $\frac{2GM_U}{c^2} = ct_H = \frac{c}{H}$

so: $\boldsymbol{M_U = \frac{c^3}{2GH}}$ $\approx 8.77 \times 10^{52}$ kg

and: $N_U = M_U/1.008$ amu $\approx 5.24 \times 10^{79}$

linear density (?useful?): M_U/D_H $\approx 6.74 \times 10^{26}$ kg/m

N_U/D_H $\approx 4.02 \times 10^{53}$ /m

SDF-based mass of entire universe:

SDF object count:	N_{SDF}	$= 1\,400\,107$	
SDF solid field angle:	$\Omega_{\mathrm{SDF}} = 30' \times 37'$	$\approx 9.39 \times 10^{-5}$	sr
approximate full sky count:	$N_{\text{@}} = \frac{4\pi N_{\mathrm{SDF}}}{\Omega_{\mathrm{SDF}}}$	$\approx 2.2 \times 10^{11}$	
estim. mean galaxy mass:	$m_{\text{@}} \approx \frac{M_{\mathrm{MW}}}{10}$	$\approx 2 \times 10^{41}$	kg
estim. total galactic mass:	$M_{\text{@}} = N_{\text{@}} \cdot m_{\text{@}}$	$\approx 4.4 \times 10^{52}$	kg
estim. intergalactic medium[6]:	$M_{\mathrm{IGM}} = M_{\text{@}}$	$\approx 4.4 \times 10^{52}$	kg
Total mass of universe:	M_{U}	$\approx \mathbf{8.8 \times 10^{52}}$	**kg**
just derived from truths:	$M_{\mathrm{U}} = \frac{c^3}{2GH}$	$\approx \mathbf{8.77 \times 10^{52}}$	**kg**

P.42: HUDF: 6.26 Mobj/deg^2, SDF: 4.54 Mobj/deg^2 ⇒ SDF underestimates galactic mass by 27%, could be countered by less IGM, which above is a *very* rough estimate.

∴ there exists ***NO*** mysterious fictitious dark matter !

[6] in accordance with: https://en.wikipedia.org/wiki/Warm%E2%80%93hot_intergalactic_medium

Some characteristics of the universe:

mass: $M_\mathrm{U} = \frac{c^3}{2GH} = \frac{c^3}{2} \cdot \frac{t_\mathrm{H}}{G}$ $\approx 8.77 \times 10^{52}$ kg

#H-atoms: $N_\mathrm{U} = M_\mathrm{U}/1.008$ amu $\approx 5.24 \times 10^{79}$

3S-volume: $V_\mathrm{U} = \frac{2D_\mathrm{H}^3}{\pi} = \frac{2c^3}{\pi H^3} = \frac{2c^3 t_\mathrm{H}^3}{\pi}$ ≈ 1663 Gly^3

mean density: $\rho_\mathrm{U} = \frac{M_\mathrm{U}}{V_\mathrm{U}} = \frac{\pi M_\mathrm{U}}{2c^3 t_\mathrm{H}^3}$ $\approx 6.23 \times 10^{-26}$ kg/m^3

≈ 37.5 H-atoms/m^3

mean free path: $\ell_\mathrm{H} = 1/\left(\rho_\mathrm{U}\left(\pi r_\mathrm{B}^2\right)\sqrt{2}\right)$ ≈ 227 light years

$\ell_p = 1/\left(\rho_\mathrm{U}(100\ \mathrm{mb})\sqrt{2}\right)$ ≈ 199 bln. ly

If all mass in the universe were a straight rod of length D_H

its radius would be: $r = \sqrt{V/\pi D_\mathrm{H}} = \sqrt{M_\mathrm{U}/\pi\rho_\mathrm{rod} D_\mathrm{H}}$

close-packed

- neutronium: $\rho_\mathrm{n,cp} = 5.8 \times 10^{17}$ kg/m^3 $\therefore \varnothing \approx 38$ km
- hydrogen atoms: $\rho_\mathrm{H,cp} = 1996$ kg/m^3 $\therefore \varnothing \approx 4.4$ au

iron: $\rho_\mathrm{Fe} = 7874$ kg/m^3 $\therefore \varnothing \approx 2.2$ au

As a sphere of close-packed H: $\varnothing \approx 5.6$ ly; as sphere of Fe: $\varnothing \approx 3.5$ ly.

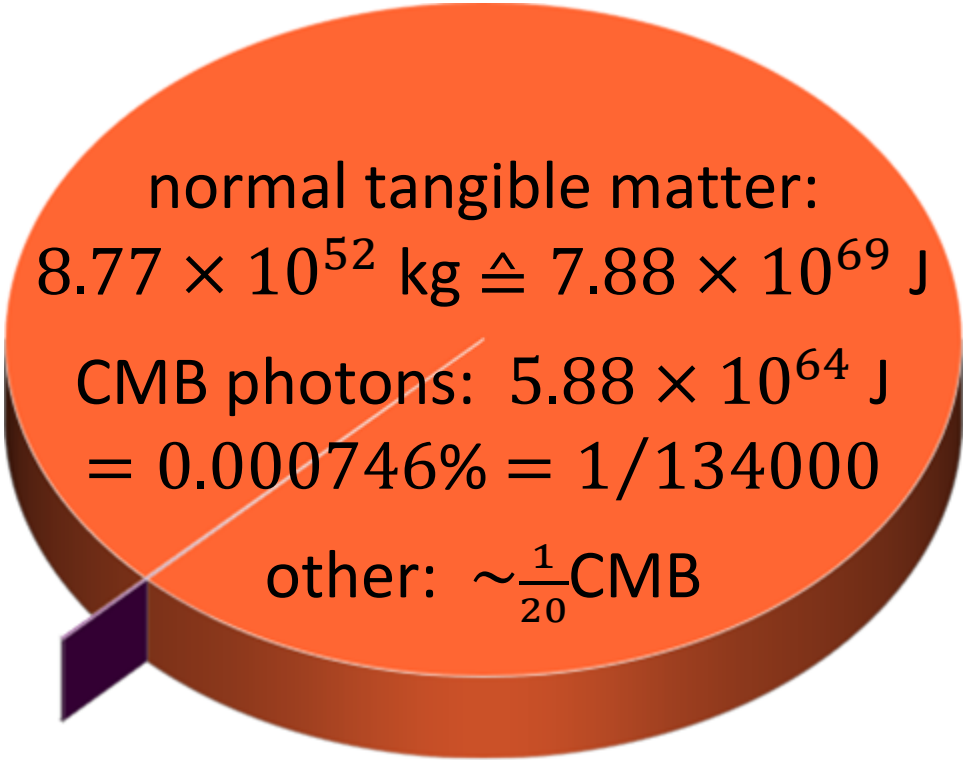
CMB ($\approx 20 \times$ EBL[7]) energy density:	$\rho_{E,\mathrm{CMB}}$	$\approx 4.1748 \times 10^{-14}$	J/m^3
Volume of universe:	V_U	≈ 1663	Gly^3
Total CMB energy:	$E_\mathrm{CMB} = \rho_{E,\mathrm{CMB}} V_\mathrm{U}$	$\approx 5.88 \times 10^{64}$	J
Mass of universe:	M_U	$\approx 8.77 \times 10^{52}$	kg
Energy of universe:	$E_\mathrm{U} = M_\mathrm{U} c^2$	$\approx 7.88 \times 10^{69}$	J
Ratio:	$E_\mathrm{U}/E_\mathrm{CMB}$	$\approx 134\,000$	

ERGO:
the universe is to be considered matter-only.

$\boldsymbol{\Omega_{0,R} = 1/134001}$, $\boldsymbol{\Omega_{0,M} = 1 - \Omega_{0,R}}$, $\boldsymbol{\Omega_{0,k} = 0}$, $\boldsymbol{\Omega_\Lambda =}$ **BUNKUM!**

[7] Simon P. Driver *et al* 2016 *ApJ* **827** 108, https://dx.doi.org/10.3847/0004-637X/827/2/108

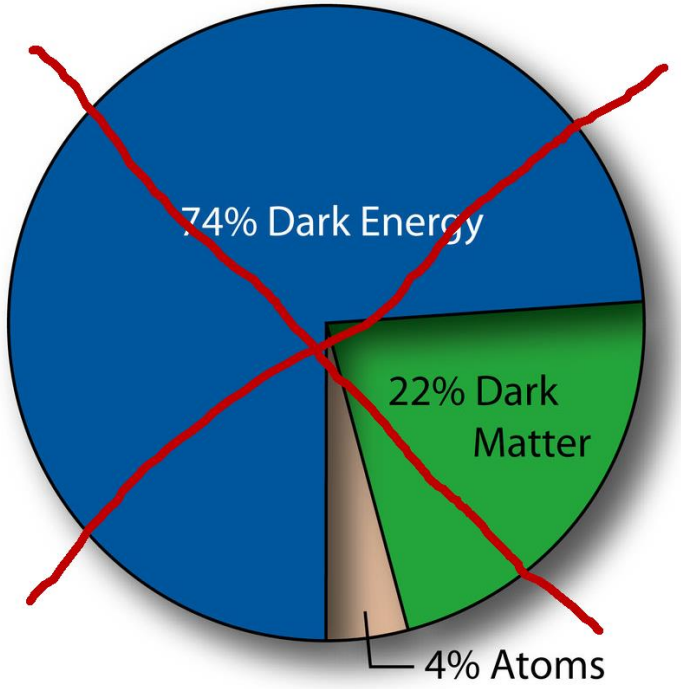
The universe consists of:



100% normal matter.

That's all there is.

NO dark matter;
NO dark energy.



https://www.researchgate.net/figure/A-pie-chart-of-the-content-of-the-Universe-today-Credit-NASA-WMAP-Science-Team_fig3_51950465

Neil deGrasse Tyson: We are 96% stupid

https://www.youtube.com/watch?v=rmfsom2tVtM

Ex obſervatis phænomenis deductum eſt
& hypotheſes non finxi.

2-surface of 2-spherical equator of 3-sphere:

$$A_{2,\mathrm{eq}} = 4D_{AP}^2/\pi$$

Universe: $A_{2,\mathrm{eq,U}} = 4D_{\mathrm{H}}^2/\pi$ $\approx 2.16 \times 10^{52}$ m^2

≈ 241.5 Gly^2

"circumference of universe"

Surface density of
mass of universe projected on it:

$$\rho_{2,\mathrm{eq,U}} = \frac{\pi M_{\mathrm{U}}}{4D_{\mathrm{H}}^2}$$

$$= \frac{\pi}{4\left(\frac{c}{H}\right)^2} \cdot \frac{c^3}{2GH} \approx \frac{\pi cH}{8G} \approx 4.06 \ \mathrm{kg/m^2}$$

cf. a homogeneous water film with a thickness of 4 mm.

https://arxiv.org/pdf/gr-qc/9607009.pdf (1996-07-04)

Versions of Mach's Principle

("EC" = Einsteinian Cosmology)

Mach8:

$\Omega = 4\pi\rho GT^2$ is a definite number of order unity. (Here, ρ is the mean density matter in the universe and T is the Hubble time. Makes sense in EC only.) Ω does seem to be of order unity in our present universe, but note that of all EC models, only the Einstein–DeSitter [HR: that's essentially Euclidean] makes this number a constant, if Ω is not exactly one. Making a theory in which this approximate equality appears natural is a worthwhile and ongoing effort.

$$G = \frac{\Omega}{4\pi\rho_U t_H^2} \approx \frac{1}{4\pi\rho_U t_H^2}$$

$$M_{\mathrm{U}} = \frac{c^3}{2GH}$$ yields: $$G = \frac{c^3}{2M_{\mathrm{U}}} \cdot t_{\mathrm{H}}$$

⇒ *deduced* from *ascertained truths*

∴ **from now on te be considered a truth!**

⇒ **zero gravity** during BB

∴ all mass easily escapes the THING.

$$G = \frac{c^3}{2\rho_{\mathrm{U}} V_{\mathrm{U}}} \cdot t_{\mathrm{H}} = \frac{c^3}{2\rho_{\mathrm{U}} \frac{2D_{\mathrm{H}}^3}{\pi}} \cdot t_{\mathrm{H}} = \frac{\pi}{4\rho_{\mathrm{U}} t_{\mathrm{H}}^2}$$

i.e. the 3S version of **Mach8**. Now proven.

Any Schwarzschild radius: $$r_{\mathrm{S}} = \frac{2GM}{c^2} = 2 \cdot \frac{c^3 t_{\mathrm{H}}}{2M_{\mathrm{U}}} \cdot \frac{M}{c^2} = \frac{M}{M_{\mathrm{U}}} D_{\mathrm{H}}$$

(but since $\frac{r_{\mathrm{S}}}{M} = \frac{2G}{c^2}$ is same for each mass, this is nothing special).

Volume of 3S-universe: $$V_{\mathrm{U}} = \frac{2D_{\mathrm{H}}^3}{\pi} = \frac{2c^3t_{\mathrm{H}}^3}{\pi}$$

so: $$\frac{d^2V_{\mathrm{U}}}{dt_{\mathrm{H}}^2} = \ddot{V}_{\mathrm{U}} = \frac{12c^3t_{\mathrm{H}}}{\pi} \approx 13.36\ \mathrm{kau/s^2}$$

with Mach8: $$G = \frac{c^3t_{\mathrm{H}}}{2M_{\mathrm{U}}}$$

we obtain: $$\boldsymbol{GM_{\mathrm{U}} = \frac{\pi}{24}\ddot{V}_{\mathrm{U}}}$$

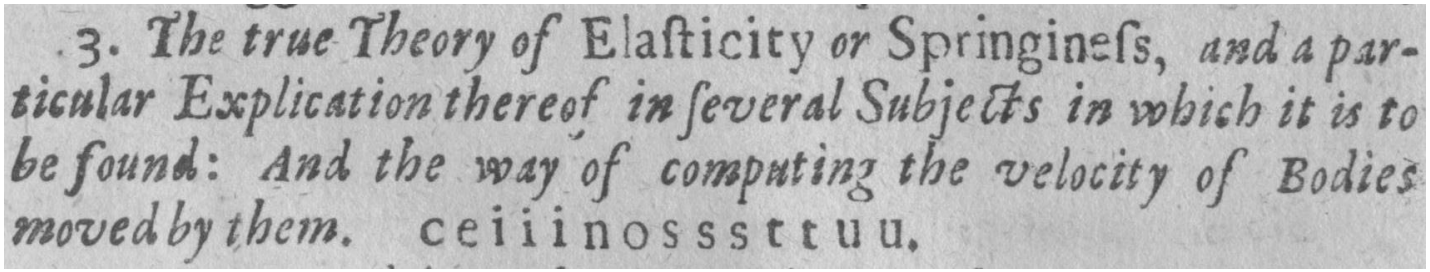
or, with $\kappa = \frac{8\pi G}{c^4}$: $$\kappa M_{\mathrm{U}} = \frac{\pi^2}{3c^4}\ddot{V}_{\mathrm{U}} = \frac{2\ddot{V}_{\mathrm{U}}}{c^4}\sum_{n=1}^{\infty}\frac{1}{n^2}$$

dimension: $[\mathrm{T}^2 \cdot \mathrm{L}^{-1}]$ = reciprocal linear acceleration (cf. Eqv. Pr.).

Note: $$\sum_{n=1}^{\infty}\frac{1}{n^2} = \frac{\pi^2}{6} = \zeta(2) = \frac{1}{P_{\mathrm{coprime}}}$$

Mach8: $GM_{\mathrm{U}} = \frac{1}{2}c^3 t_{\mathrm{H}} = \frac{1}{2}c^2 D_{\mathrm{H}}$

?



3. The true Theory of Elasticity or Springiness, and a particular Explication thereof in several Subjects in which it is to be found: And the way of computing the velocity of Bodies moved by them. ceiiinosssttuu.

?

From: A DESCRIPTION OF HELIOSCOPES, And some other INSTRUMENTS MADE BY ROBERT HOOKE, Fellow of the *Royal Society*.

$$\kappa M_{\mathrm{U}} = \frac{8\pi}{c^4} G M_{\mathrm{U}} = \frac{4\pi}{c^2} D_{\mathrm{H}}$$

$$\boldsymbol{\kappa E_{\mathrm{U}} = 4\pi D_{\mathrm{H}}}$$

$$\kappa \frac{E_{\mathrm{U}}}{V_{\mathrm{U}}} = \frac{4\pi D_{\mathrm{H}}}{2D_{\mathrm{H}}^3/\pi} = \frac{2\pi^2}{D_{\mathrm{H}}^2} = \frac{2}{R_{\mathrm{hyp}}^2}$$

Elimination of a "*fundamental constant*":

$$G = \frac{c^2}{2} \cdot \frac{D_\mathrm{H}}{M_\mathrm{U}}$$

reciprocally proportional to U's linear density (see p.80).

$$\frac{c^2}{2} = V_\mathrm{S} =$$ abs. depth of potential well @r_S around *any* BH[8].

$$G = \frac{D_\mathrm{H}}{M_\mathrm{U}} V_\mathrm{S} \qquad (\because V_\mathrm{S} = \frac{GM_\mathrm{U}}{D_\mathrm{H}})$$

There are no arbitrary constants.

— Albert Einstein —

[8] BH = any mass that fits within its own "Schwarzschild sphere";
see also: http://henk-reints.nl/astro/HR-fall-into-black-hole-slides.pdf

Energy density of universe:

$$\rho_E = \rho_{\mathrm{U}} c^2, \quad \text{today: } \sim 5.60 \times 10^{-9}\ \mathrm{J/m^3};$$

corresponding pressure (cf. degeneracy pressure):

$$p_{\mathrm{U}} = \tfrac{2}{3}\rho_{\mathrm{U}} c^2; \quad \text{today: } \sim 3.73 \times 10^{-9}\ \mathrm{Pa}.$$

$p_{\mathrm{U}} \propto V_{\mathrm{U}}^{-1}$, i.e. large in beginning;
similar to pressure needed to blow a balloon.

This pressure might be seen as cause of expansion, although I am convinced the latter comes from "within" the 3-sphere.

Or might gravitation be similar to surface tension?

See http://henk-reints.nl/astro/HR-Gravitation-volume-tension.pdf .

3S radius of curvature: $r_{\mathrm{curve,3S}} = R_{\mathrm{3S}} = \frac{1}{\pi} D_{\mathrm{H}}$

grav. light deflection: $r_{\mathrm{curve},\gamma} = r_{\mathrm{p}} \left(\frac{r_{\mathrm{p}}}{r_{\mathrm{S}}} + \frac{3}{2} \right)$

(see: http://henk-reints.nl/astro/HR-curvature-of-hyperbola-of-light-deflection.pdf)

Just found: $r_{\mathrm{S}} = \frac{M D_{\mathrm{H}}}{M_{\mathrm{U}}}$

yielding: $r_{\mathrm{curve},\gamma} = r_{\mathrm{p}} \left(\frac{r_{\mathrm{p}} M_{\mathrm{U}}}{M D_{\mathrm{H}}} + \frac{3}{2} \right)$

IF: $r_{\mathrm{p}} = D_{\mathrm{H}} \ \& \ M = M_{\mathrm{U}}$

then: $r_{\mathrm{curve},\gamma} = \frac{5}{2} D_{\mathrm{H}}$

Equations are rather different, hence
3-sphericality plausibly not general relativistic.

Friedmann-Lemaître-Robertson-Walker metric:

$$\left(\frac{\dot{a}}{a}\right)^2 + \frac{kc^2}{a^2} - \frac{\Lambda c^2}{3} = \frac{8\pi G}{3}\rho \quad \& \quad 2\frac{\ddot{a}}{a} + \left(\frac{\dot{a}}{a}\right)^2 + \frac{kc^2}{a^2} - \Lambda c^2 = -\frac{8\pi G}{c^2}p$$

① **The universe is a 3S, but not a GR one** (using *time*);
plausibly flat as far as GR is concerned: $k = 0$;

② **erroneously assumes G constant over time;**

③ **Λ is a concoction, so those terms should be removed;**
expansion has been linear from 0@*BB* to D_H@*NOW*;

④ **added value of FLRW is NULL & VOID.**

COMOVING DISTANCE[9]:

🤔 not a distance at all, but angle between bodies as seen from glome's centre;

☑ **dimensionless distance**: $0 \leq \boldsymbol{\rho} = \frac{\boldsymbol{r}}{\boldsymbol{D_H}} < 1$;
if it does not change =: "Hubble stationary".

[9] Who invented that incomprehensible term?

Gravitational potential: $V_g = -\frac{GM}{r}$ M = mass of some body (not somebody!);

cosmic expansion: $r = \rho D_{\mathrm{H}} = \rho c t_{\mathrm{H}}$ ρ = dimensionless distance to it;

Mach8: $G = \frac{c^3 t_{\mathrm{H}}}{2M_{\mathrm{U}}}$

hence: $V_g = \frac{-c^2 M}{2\rho M_{\mathrm{U}}} = \frac{-c^2}{2} \cdot \frac{\mu}{\rho}$ μ = dimensionless mass; μ/ρ = diml. grav. influence[10].

⇒ for Hubble stationary objects ($\rho = constant$), the gravitational potential is independent of cosmic expansion.

Conclusion: **cosmic expansion requires *NO* energy**;

⇒ NO gravitational slowing down of expansion.

[10] see http://henk-reints.nl/astro/HR-fall-into-black-hole-slides.pdf

Cosmic expansion requires

NO ENERGY.

(Potential) energy density of cosmos = 0

(plus an integration constant, okay, you'll win that one).

Dark energy is a fiction,

not deduced from ascertained truths;

cf. phlogiston.

Mass is an amount of tangible stuff & therefore I consider it truly constant.

Sir Isaac Newton:

Page 1:

Philoſophiæ Naturalis

PRINCIPIA

MATHEMATICA.

DEFINITIONES.

DEFINITIO I.

Quantitas materiæ eſt menſura ejuſdem orta ex illius denſitate et magnitudine conjunctim.

(...)

Hanc autem quantitatem ſub nomine corporis vel maſſæ in ſequentibus paſſim intelligo.

Amount of matter is the same measure as what arises from its density and volume combined.

Moreover, it is this quantity that I mean hereafter by the name of body or mass.

HR: energy is an untangible form of mass.

Mach8: $G = \frac{c^3}{2M_\mathrm{U}} \cdot t_\mathrm{H}$

Max Planck defined[11]: $m_\mathrm{P} = \sqrt{hc/G}$ (*he did not use ħ!*)

therefore: $m_\mathrm{P} = \sqrt{hc\frac{2M_\mathrm{U}}{c^3 t_\mathrm{H}}} \;\therefore\; m_\mathrm{P}^2 = \frac{2hM_\mathrm{U}}{c^2 t_\mathrm{H}}$

hence: $\frac{h}{m_\mathrm{P}^2} = \frac{c^2}{2M_\mathrm{U}} t_\mathrm{H}$

IF: M_U = *truly constant* & c = *truly constant*:

either h = *truly constant* & $\boldsymbol{m_\mathrm{P} \propto \sqrt{1/t_\mathrm{H}}}$

⇒ useless; m_P not a fundamental unit at all;

or m_P = *truly constant* & $\boldsymbol{h \propto t_\mathrm{H}}$

⇒ m_P just *some* (superfluous) unit of mass;

$\boldsymbol{h \propto t_\mathrm{H}}$ seems more plausible.

[11] Ueber irreversibele Strahlungsvorgänge, 1899-11-07, https://zenodo.org/record/1423973

Of any quantifiable property proportional to t_H:

10^{th} significant digit lives merely $10^{-10} \cdot t_\mathrm{H} \approx$ **500 days!**

Could be measurable!

Might enable determination of H!

But be sapiens: $G \propto t_\mathrm{H}$ as well and maybe also the second itself!

(Josephson constant: $K_\mathrm{J} = 2e/h$, von Klitzing constant: $R_\mathrm{K} = h/e^2$)

Let: $\Delta m_\mathrm{u} := \frac{m_\mathrm{P}^2}{2M_\mathrm{U}} = \frac{1}{c^2} \cdot \frac{h}{t_\mathrm{H}} = \frac{hH}{c^2}$

with $\frac{h}{t_\mathrm{H}} = hH$ now presumed truly constant:

$\Delta m_\mathrm{u} \approx 1.696 \times 10^{-68}$ kg

be a: **truly fundamental unit of mass;**

then: $h = \Delta m_\mathrm{u} c^2 t_\mathrm{H}$

Using: $\frac{M_\mathrm{U}}{\Delta m_\mathrm{u}} = \frac{c^3}{2GH} \cdot \frac{c^2}{hH} = \frac{c^5}{2} \cdot \frac{t_\mathrm{H}}{G} \cdot \frac{t_\mathrm{H}}{h}$

we obtain: $M_\mathrm{U} \approx 5.171 \times 10^{120} \cdot \Delta m_\mathrm{u}$

Planck also defined: $l_{\mathrm{P}} = \sqrt{hG/c^3}$ (*he did not use ħ!*)

which with both: $h \propto t_{\mathrm{H}}$

and: $G \propto t_{\mathrm{H}}$

yields: $\boldsymbol{l_{\mathrm{P}} \propto t_{\mathrm{H}}}$

$=$ expanding with the cosmos!

Planck units would not be constant over time;

even the Planck time: $t_{\mathrm{P}} = \frac{l_{\mathrm{P}}}{c} \propto t_{\mathrm{H}}$ would grow with time itself.

With $G \propto t_{\mathrm{H}}$ and $h \propto t_{\mathrm{H}}$:

many "laws" of physics incorrect!

Compton wavelength of Δm_{u}:

$$\boldsymbol{\lambda_{\mathrm{C},\Delta m_{\mathrm{u}}}} = \frac{h}{\Delta m_{\mathrm{u}} c} = \frac{h}{c} \cdot \frac{c^2}{hH} = \frac{c}{H} = \boldsymbol{D_{\mathrm{H}}}$$

hence: $$\boldsymbol{\Delta m_{\mathrm{u}} := \frac{h}{c D_{\mathrm{H}}} = \frac{hH}{c^2}}$$

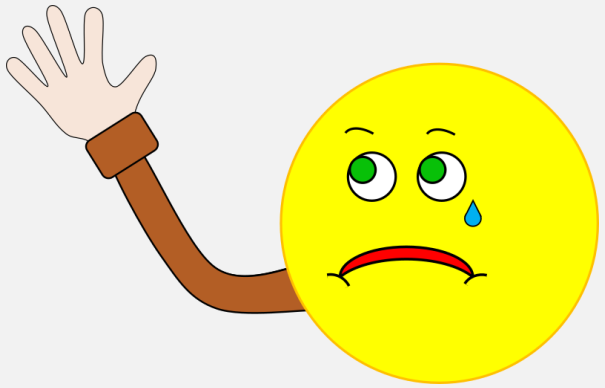
Planck units superfluous?

$$m_{\mathrm{P}} = \sqrt{\hbar c / G} \qquad 2.176431 \times 10^{-8}\ \mathrm{kg}$$

$$T_{\mathrm{P}} = m_{\mathrm{P}} c^2 / k_{\mathrm{B}} \qquad 1.416772 \times 10^{+32}\ \mathrm{K}$$

$$l_{\mathrm{P}} = m_{\mathrm{P}} \boldsymbol{G} / c^2 \qquad 1.616263 \times 10^{-35}\ \mathrm{m}$$

$$t_{\mathrm{P}} = l_{\mathrm{P}} / c \qquad 5.391291 \times 10^{-44}\ \mathrm{s}$$



Truly constant fundamental units would be:

mass: $\Delta m_{\mathrm{u}} = \frac{hH}{c^2} \approx 1.696 \times 10^{-68}$ kg

energy: $\Delta E_{\mathrm{u}} = \Delta m_{\mathrm{u}} c^2 = hH \approx 1.525 \times 10^{-51}$ J

Das hH-Erlebnis!

temp.: $\Delta T_{\mathrm{u}} = \frac{2\Delta E_{\mathrm{u}}}{3k_{\mathrm{B}}} = \frac{2hH}{3k_{\mathrm{B}}} \approx 7.362 \times 10^{-29}$ K

$h/G = \frac{2M_{\mathrm{U}}\Delta m_{\mathrm{u}}}{c} \approx 9.927\,738 \times 10^{-24}$ kg^{2}s/m

$G/t_{\mathrm{H}} = GH = \frac{c^3}{2M_{\mathrm{U}}} \approx 1.536 \times 10^{-28}$ m^3/s^3/kg

$h/t_{\mathrm{H}} = hH = \Delta E_{\mathrm{u}} \quad \therefore \Delta E_{\mathrm{u}} t_{\mathrm{H}} = h$ (cf. Heisenberg)

---

mass for with Schwarzschild diameter = Compton wavelength:

$\frac{4Gm_{\mathrm{SC}}}{c^2} = \frac{h}{m_{\mathrm{SC}} \cdot c} \therefore m_{\mathrm{SC}} = \sqrt{\frac{ch}{4G}} = \sqrt{\frac{M_{\mathrm{U}}\Delta m_{\mathrm{u}}}{2}}$ $\approx 27.277\,56$ µg $\approx 1.642\,693 \times 10^{19}$ Da

$$\boldsymbol{\lambda_{C,M_U}} = \frac{h}{cM_U} = \frac{h}{c}\cdot\frac{2GH}{c^3} = \frac{2GhH}{c^4} = \frac{hH}{c^2}\cdot\frac{2G}{c^2} = \boldsymbol{\Delta m_u \frac{2G}{c^2} = \frac{\Delta m_u}{M_U} D_H = r_{S,\Delta m_u}}$$

Not truly constant units ($\propto t_H$): today's value:

length: $\Delta l_u = \lambda_{C,M_U} = \frac{2GhH}{c^4} \approx 2.519 \times 10^{-95}$ m

time: $\Delta t_u = \frac{\Delta l_u}{c} = \frac{2GhH}{c^5} \approx 8.404 \times 10^{-104}$ s

IF ***all*** $\Delta t \geq \Delta t_u$: ***all*** $\nu \leq \frac{1}{\Delta t_u} = \frac{c^5}{2GhH} \approx 1.190 \times 10^{103}$ Hz

$$\varnothing_{SC} = \lambda_{SC} = \sqrt{\frac{2\Delta m_u}{M_U}}\cdot D_H$$

$$= \sqrt{\frac{2M_U}{\Delta m_u}}\cdot \lambda_{C,M_U} = \sqrt{\frac{4hG}{c^3}} \approx 8.1027 \times 10^{-35} \text{ m}$$

PRESUMPTION:

energy & *mass* **not** $\propto t_{\mathrm{H}}$;

$\Rightarrow$ energy levels in atoms would not change,
including hyperfine levels of ^{133}Cs;

but: $h \propto t_{\mathrm{H}} \rightarrow \Delta\nu_{\mathrm{Cs}} \propto 1/t_{\mathrm{H}}$

$\Rightarrow$ 9 192 631 770 periods = 1 second
would gradually take more time as t_{H} grows;

$\boldsymbol{h \propto t_{\mathrm{H}} \rightarrow}$ **second** $\boldsymbol{\propto t_{\mathrm{H}}}$ **as well;**

hence also: metre $\boldsymbol{\propto t_{\mathrm{H}}}$ **.**

Growing ruler! *Unchanging light travel time ⇨ distance!*
Expansion of lunar distance (p.10) unmeasurable!

Merely a contemplation:

If you *do not* or *cannot* observe in *all* directions, you'll end up with an uncertainty:

Heisenberg: $\Delta E \Delta t \geq \frac{\hbar}{2} = \frac{h}{4\pi}$

If you *DO* observe the smallest detail in *all* directions *ALL* the time, you'll end up with completeness:

Universe: $\Delta E_{\mathrm{u}} t_{\mathrm{H}} = h$

Existance postulate[12]:

An entity cannot exist unless it is able to fully manifest all of its properties.

Δm_{u} has: $\lambda_{\mathrm{C}} = D_{\mathrm{H}}$

$\Rightarrow$ Δm_{u} = smallest nonzero mass able to exist in cosmos; smaller wouldn't fit. Mass quantum?

$\nu = \dfrac{c}{\lambda_{\mathrm{C},\Delta m_{\mathrm{u}}}} = \dfrac{c}{D_{\mathrm{H}}} = H$: smallest possible frequency?

$\Rightarrow$ fundamentally impossible to stand still?

Must things rotate/move? *Must* the universe expand?

Must all (I mean ***ALL***) waves of any kind fit in the Hubble distance?

2023-10-20: Hmm..., would a guitar string fit?

[12] see http://henk-reints.nl/astro/HR-fall-into-black-hole-slides.pdf

$$\Delta l_{\mathrm{u}} = \lambda_{\mathrm{C},M_{\mathrm{U}}} = \frac{\Delta m_{\mathrm{u}}}{M_{\mathrm{U}}} D_{\mathrm{H}}$$

NO truly constant fundamental absolute unit of *length*.

In a completely emty space without any things,
distance is a meaningless concept.

Nothing could be used as a reference point.

Distance is the minimal number of identical rigid things
that can yield a contiguous connection between two things.

Only a countable fundamental thing
can serve as a fundamental unit of *length*.

$$\Delta t_{\mathrm{u}} = \frac{\Delta l_{\mathrm{u}}}{c} = \frac{\Delta m_{\mathrm{u}}}{M_{\mathrm{U}}} t_{\mathrm{H}}$$

NO truly constant fundamental absolute unit of *time*.

In a completely emty space without any **events**,
time is a meaningless concept.

No **event** could be used as a reference point.

Duration is the minimal number of identical "rigid" **events**
that can yield a contiguous connection between two **events**.

Only a countable fundamental **event**
can serve as a fundamental unit of *time*.

An event is an interaction between things.

Maybe ruled by that what we call the *speed of light*, which relates time to distance?

Is a truly constant **empty** *length* or *time span* possible at all?

Empty ≔ without counting things or events.

If distance = count of elementary things,
then distance between two adjacent elem. things = ?

If duration = count of elementary events,
then time span between two consecutive elem. events = ?

Can a fundamental unit of time be based on time-independent quantities?

The theory of nothing:

Can the absolute nothing exist?

If it existed, it would be something, which contradicts the premise...

The theory of everything:

You cannot fully describe the universe with less than all of it, but you won't need a bit more.

Please note: describe ≪ explain.

Every answer yields a new question.

FAIL := being unable to answer or
repeating an answer already given.

I observed some phenomenon.

{ ME: Why/how?

⋮ YOU: *<very sophisticated answer>*

} *REPEAT UNTIL YOU FAIL OR TRUE BOTTOM REACHED.*

ME: Why/how?

YOU: 

Kurt Gödel: there exist unprovable truths.
HR: there exist unknowable things/causes.

$$\Delta l_{\mathrm{u}} = \frac{\Delta m_{\mathrm{u}}}{M_{\mathrm{U}}} D_{\mathrm{H}} \qquad \Delta t_{\mathrm{u}} = \frac{\Delta m_{\mathrm{u}}}{M_{\mathrm{U}}} t_{\mathrm{H}}$$

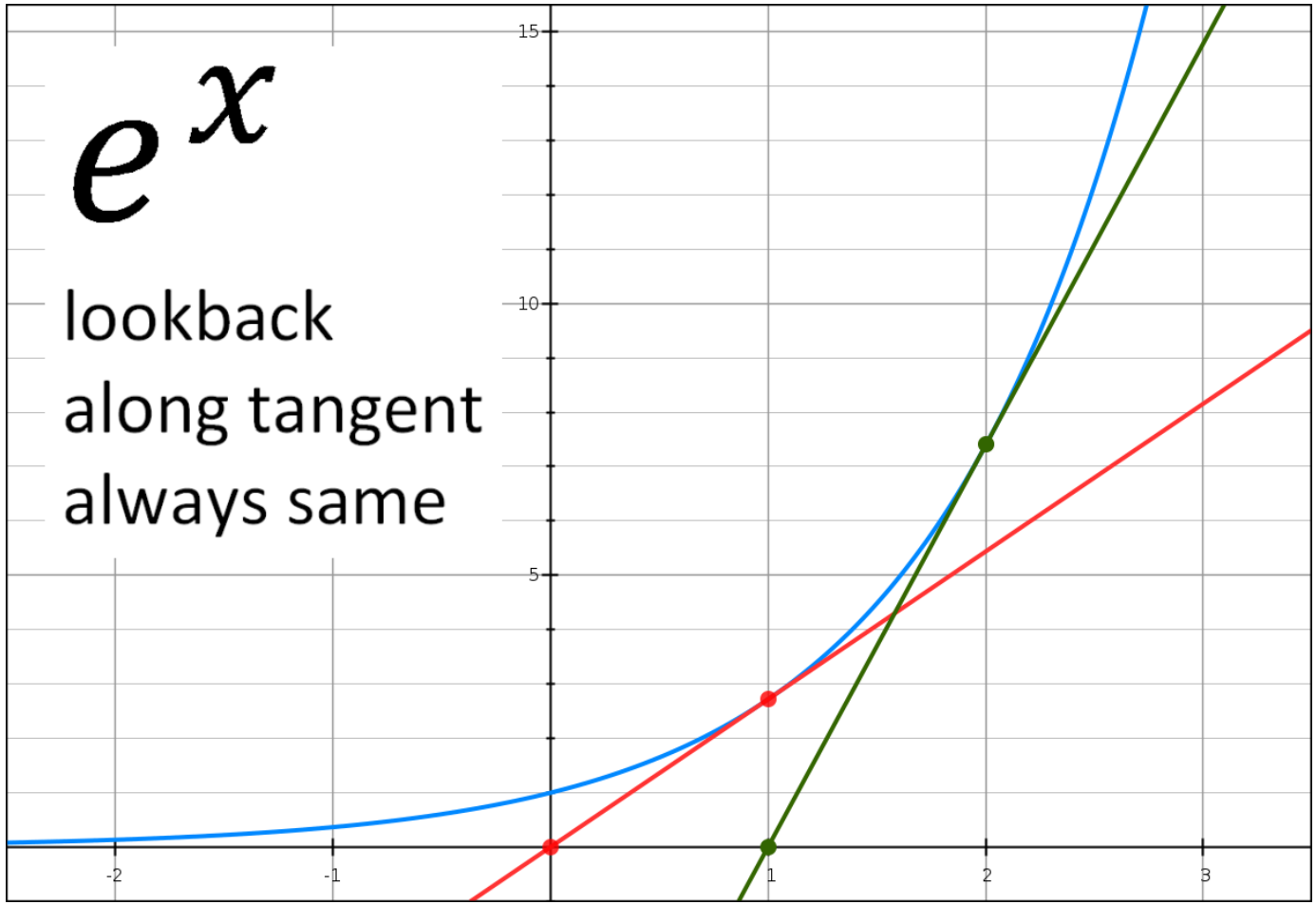
if fundamental units of length & time grow with Hubble time:

galaxies have a velocity away from us
whilst distance does not increase
& lookback time to BB would never change...

The more you think about the universe,
the better you'll understand it &
the less comprehensible it becomes.

Naive interpretation of Hubble-Lemaître, ignoring Newton's 1st:

$$v = Hr \quad \therefore \frac{dr}{dt} = Hr \quad \therefore \boldsymbol{r = e^{Ht}}$$



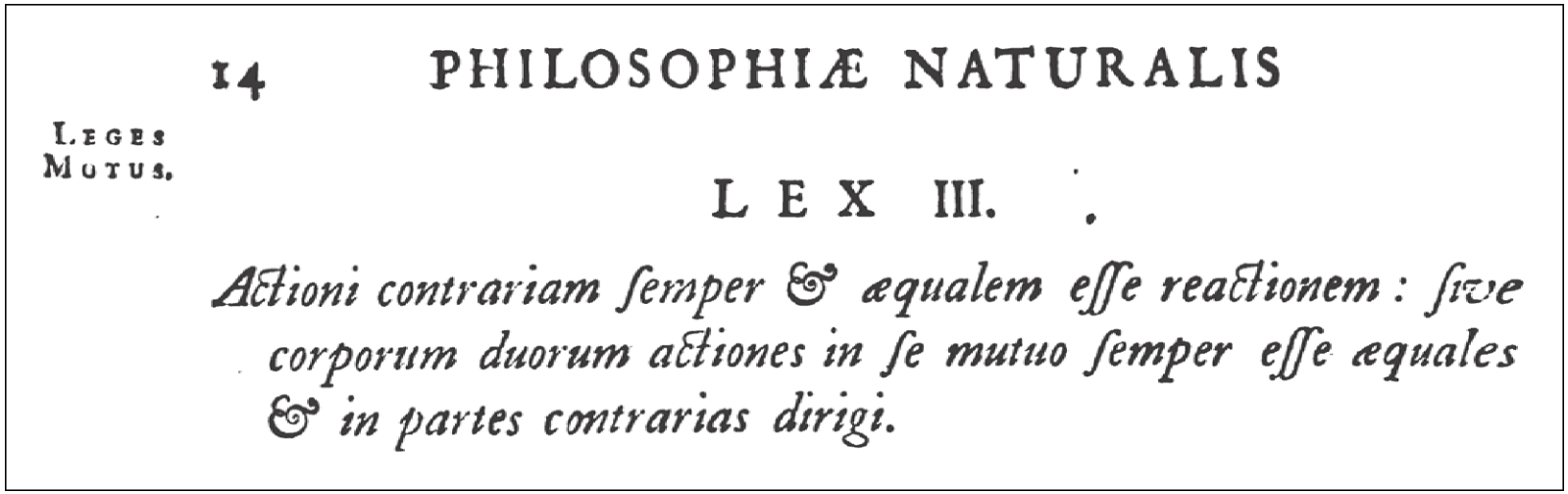
Are *length* and *time* fundamental quantities at all?

Or do they merely emerge from other quantities?

Kinematic:	Physical:
acceleration = same w.r.t. *all* inert bodies;	***specific force*** = exerted only on body itself;
velocity = w.r.t. other entity.	***specific momentum*** = w.r.t. other entity.

Specific force = *acceleration*; ultimate effect is motion.

Sir Isaac Newton:



14 PHILOSOPHIÆ NATURALIS

LEGES MOTUS.

LEX III.

Actioni contrariam ſemper & æqualem eſſe reactionem: ſive corporum duorum actiones in ſe mutuo ſemper eſſe æquales & in partes contrarias dirigi.

LAW III.

To every action there is always opposed an equal reaction: or the mutual actions of two bodies upon each other are always equal, and directed to contrary parts.

HR: *force* on a single body is a meaningless concept,
but two bodies suffice, so *force* is a *local* quantity.

(*which does not mean its effect is only at short distance,*
but no more bodies are required).

Specific force: a fundamental physical quantity;
specific momentum: primary result thereof.

Suggestion:

acceleration =

primary fundamental kinematic quantity;
no need to explain its absoluteness nor that of rotation;

velocity =

primary result thereof.

$$\boldsymbol{dv = a\,dt} \quad \therefore \quad \boldsymbol{dt = \frac{dv}{a}}$$

$$\boldsymbol{ds = v\,dt} \quad \therefore \quad \boldsymbol{dt = \frac{ds}{v}}$$

$$a = 0 \implies dv = 0 \implies dt = \frac{0}{0} = ?$$

$$v = 0 \implies ds = 0 \implies dt = \frac{0}{0} = ?$$

If both $a = 0$ & $v = 0$ then *time* is indeterminate, hence a meaningless concept.

If $a = 0$ then $v \neq 0$ is compulsory

(w/o acceleration, motion w.r.t. everything else would be mandatory, which is just what the expanding universe does,

see p.105: "H = smallest possible frequency?").

Two inert bodies cannot have zero mutual velocity.

Since time apparently ***must*** progress,
I ***cannot*** have zero acceleration when
my velocity w.r.t. Earth equals nought.

But the resilience of Earth & chair stops my free fall = inert motion by exerting an upward force.

This force implies non-zero (pseudo) acceleration.
(*Allowing time to progress?*)

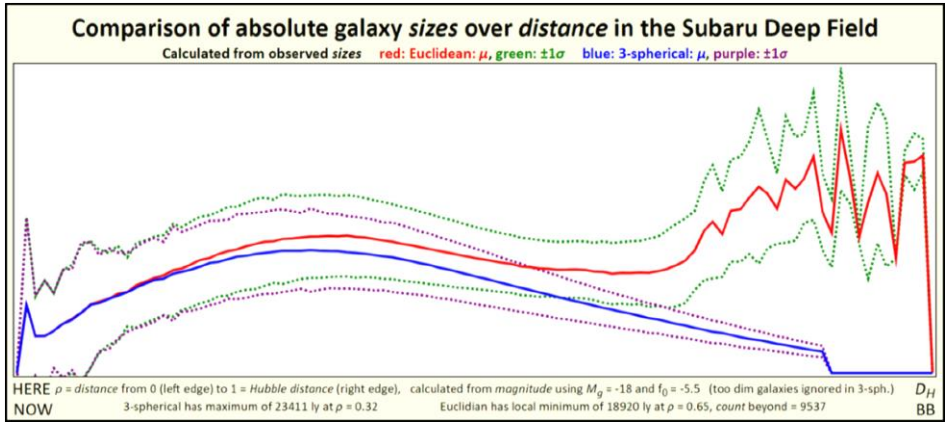
Feeling my weight
seems related
to progress of time.

Might it be that gravitation actually is *identical* to progress of time?

Mach8: $G = \frac{c^3}{2M_{\mathrm{U}}} t_{\mathrm{H}}$

Edwin Hubble: inter*g*alactic expansion of universe;

Henk Reints: intra*g*alactic = inter*s*tellar expansion;



presumably: intra*s*tellar = inter*a*tomic expansion;

Bohr radius: $r_{\mathrm{B}} = \frac{\hbar}{\alpha m_{\mathrm{e}} c} = \frac{h}{2\pi\alpha m_{\mathrm{e}} c} \propto \boldsymbol{t_{\mathrm{H}}}$ (if αm_{e} truly const.)

must be: **intra-atomic expansion!**

Hubble distance:		$5.171 \times 10^{120} \cdot \Delta l_{\mathrm{u}}$
Hubble time:		$5.171 \times 10^{120} \cdot \Delta t_{\mathrm{u}}$
mass of cosmos:		$5.171 \times 10^{120} \cdot \Delta m_{\mathrm{u}}$
Bohr radius:		$2.100 \times 10^{84} \cdot \Delta l_{\mathrm{u}}$
neutron mass:		$9.867 \times 10^{40} \cdot \Delta m_{\mathrm{u}}$
proton mass:		$9.862 \times 10^{40} \cdot \Delta m_{\mathrm{u}}$
electron mass:		$5.371 \times 10^{37} \cdot \Delta m_{\mathrm{u}}$
neutrino mass:	$\leq$	$1.262 \times 10^{31} \cdot \Delta m_{\mathrm{u}}$

Might all of these values actually be integers?

$$\frac{D_\mathrm{H}}{r_\mathrm{B}} = \frac{ct_\mathrm{H}}{h/2\pi\alpha m_\mathrm{e}c} = \frac{2\pi\alpha m_\mathrm{e}c^2 t_\mathrm{H}}{h=\Delta m_\mathrm{u}c^2 t_\mathrm{H}} = 2\pi\alpha\frac{m_\mathrm{e}}{\Delta m_\mathrm{u}} \approx 2.462\times10^{36}$$

$$\therefore \frac{\boldsymbol{D_\mathrm{H}}}{\boldsymbol{2\pi r_\mathrm{B}}} = \boldsymbol{\alpha}\frac{\boldsymbol{m_\mathrm{e}}}{\boldsymbol{\Delta m_\mathrm{u}}} \therefore \boldsymbol{\alpha} = \frac{\boldsymbol{\Delta m_\mathrm{u}}}{\boldsymbol{m_\mathrm{e}}}\cdot\frac{\boldsymbol{D_\mathrm{H}}}{\boldsymbol{2\pi r_\mathrm{B}}} = \frac{\boldsymbol{M_\mathrm{U}}}{\boldsymbol{m_\mathrm{e}}}\cdot\frac{\boldsymbol{\lambda_{\mathrm{C},M_\mathrm{U}}}}{\boldsymbol{2\pi r_\mathrm{B}}} = \frac{\boldsymbol{M_\mathrm{U}}}{\boldsymbol{m_\mathrm{e}}}\cdot\frac{\boldsymbol{\Delta l_\mathrm{u}}}{\boldsymbol{2\pi r_\mathrm{B}}}$$

$$\frac{r_\mathrm{B}}{\lambda_\mathrm{SC}} = \frac{h}{2\pi\alpha m_\mathrm{e}c}\sqrt{\frac{c^3}{4hG}} = \frac{\sqrt{c\cdot h/G}}{4\pi\alpha m_\mathrm{e}} \approx 6.531\times10^{23}$$

$$\frac{D_\mathrm{H}}{\lambda_\mathrm{SC}} = \sqrt{\frac{M_\mathrm{U}}{2\Delta m_\mathrm{u}}} = \frac{\boldsymbol{m_\mathrm{SC}}}{\boldsymbol{\Delta m_\mathrm{u}}} = \frac{\sqrt{c^5}}{2}\cdot\frac{t_\mathrm{H}}{\sqrt{hG}} \approx 1.608\times10^{60}$$

$$\frac{\lambda_\mathrm{SC}}{\Delta l_\mathrm{u}=\lambda_{\mathrm{C},M_\mathrm{U}}} = \sqrt{\frac{2M_\mathrm{U}}{\Delta m_\mathrm{u}}} = \frac{\boldsymbol{M_\mathrm{U}}}{\boldsymbol{m_\mathrm{SC}}} = \sqrt{c^5}\cdot\frac{t_\mathrm{H}}{\sqrt{hG}} \approx 3.216\times10^{60}$$

FACT: $F_{\mathrm{e}} = k_{\mathrm{e}} \cdot \frac{q_1 q_2}{r^2} = \frac{1}{4\pi\varepsilon_0} \cdot \frac{q_1 q_2}{r^2}$ (Coulomb's law)

FACT: $F_{\mathrm{g}} = G \cdot \frac{m_1 m_2}{r^2}$ (Newtonian gravitation)

hence: $\frac{F_{\mathrm{e}}}{F_{\mathrm{g}}} = \frac{1}{4\pi\varepsilon_0 G} \cdot \frac{q_1 q_2}{m_1 m_2}$

yielding: $\frac{F_{\mathrm{e,pe}}}{F_{\mathrm{g,pe}}} = \frac{1}{4\pi\varepsilon_0 G} \cdot \frac{e^2}{m_{\mathrm{p}} m_{\mathrm{e}}}$ $(\approx 2.268\,66 \times 10^{39})$

DEDUCED (3S): $G = \frac{c^3 t_{\mathrm{H}}}{2M_{\mathrm{U}}}$ (Mach8)

hence: $F_{\mathrm{g}} = \frac{c^3}{2M_{\mathrm{U}}} \cdot \frac{m_1 m_2}{r^2} \cdot t_{\mathrm{H}}$

and: $\frac{F_{\mathrm{e}}}{F_{\mathrm{g}}} = \frac{M_{\mathrm{U}}}{2\pi c^3 \varepsilon_0 t_{\mathrm{H}}} \cdot \frac{q_1 q_2}{m_1 m_2}$

PRESUMPTION: $\left\{\alpha, c, e, m_\mathrm{p}, m_\mathrm{e}, M_\mathrm{U}\left(+\frac{E_\mathrm{U}}{c^2}\right), \Delta m_\mathrm{u}\right\}$ truly constant

PRESUMPTION: $h = \Delta m_\mathrm{u} c^2 t_\mathrm{H}$

then: $\varepsilon_0 = \frac{e^2}{2\alpha h c} = \frac{e^2}{2\alpha \Delta m_\mathrm{u} c^3 t_\mathrm{H}}$

so: $\varepsilon_0 t_\mathrm{H} = \frac{e^2}{2\alpha \Delta m_\mathrm{u} c^3}$

hence: $\frac{F_\mathrm{e}}{F_\mathrm{g}} = \frac{M_\mathrm{U}}{2\pi c^3 \frac{e^2}{2\alpha \Delta m_\mathrm{u} c^3}} \cdot \frac{q_1 q_2}{m_1 m_2} =$ $\frac{\alpha}{\pi} \cdot \frac{M_\mathrm{U} \Delta m_\mathrm{u}}{e^2} \cdot \frac{q_1 q_2}{m_1 m_2}$

Mathematical beauty?

and: $\frac{F_\mathrm{e,pe}}{F_\mathrm{g,pe}} = \frac{\alpha}{\pi} \cdot \frac{M_\mathrm{U} \Delta m_\mathrm{u}}{m_\mathrm{p} m_\mathrm{e}}$ (fundamental).

With: $M_\mathrm{U} \Delta m_\mathrm{u} = \frac{c^3}{2GH} \cdot \frac{hH}{c^2} = \frac{ch}{2G}$ (elimination of H)

we get: $\frac{F_\mathrm{e,pe}}{F_\mathrm{g,pe}} = \frac{\alpha c}{2\pi} \cdot \frac{h}{G} \cdot \frac{1}{m_\mathrm{p} m_\mathrm{e}}$ (more accurately calculable)

$\approx 2.268\,66 \times 10^{39}$

is a true fundamental constant.

DEDUCED: $F_\mathrm{g} = \frac{c^3 t_\mathrm{H}}{2M_\mathrm{U}} \cdot \frac{m_1 m_2}{r^2} = \langle\langle r = \rho c t_\mathrm{H} \rangle\rangle = \frac{c}{2M_\mathrm{U}} \cdot \frac{m_1 m_2}{\rho^2} \cdot \frac{1}{t_\mathrm{H}}$

so: gravitational force between "Hubble Stationary Objects" (HSO) is reciprocal to Hubble time;

and: cosmic expansion requires ***no*** energy.

Found: $\varepsilon_0 = \frac{e^2}{2\alpha \Delta m_\mathrm{u} c^3 t_\mathrm{H}} \quad \therefore k_\mathrm{e} = \frac{1}{4\pi\varepsilon_0} = \frac{\alpha \Delta m_\mathrm{u} c^3 t_\mathrm{H}}{2\pi e^2}$

hence: $F_\mathrm{e} = \frac{\alpha \Delta m_\mathrm{u} c^3 t_\mathrm{H}}{2\pi e^2} \cdot \frac{q_1 q_2}{r^2} = \langle\langle r = \rho c t_\mathrm{H} \rangle\rangle = \frac{\alpha \Delta m_\mathrm{u} c}{2\pi e^2} \cdot \frac{q_1 q_2}{\rho^2} \cdot \frac{1}{t_\mathrm{H}}$

so: electric HSO force is reciprocal to Hubble time;

and: cf. gravitation: cosmic expansion requires ***no*** energy;
consistent with: $F_{\mathrm{e,pe}} / F_{\mathrm{g,pe}}$ truly constant.

FACT: $c^2 = \frac{1}{\varepsilon_0 \mu_0}$ | $\frac{k_\mathrm{e}}{G} = \frac{\alpha \Delta m_\mathrm{u} M_\mathrm{U}}{\pi e^2}$

hence: $\mu_0 = \frac{1}{\varepsilon_0 c^2} = \frac{2\alpha \Delta m_\mathrm{u} c}{e^2} \cdot t_\mathrm{H}$ | $k_\mathrm{e} = \frac{\alpha c h}{2\pi e^2}$

Found: $\varepsilon_0 \propto 1/t_{\mathrm{H}}$

and: $\mu_0 \propto t_{\mathrm{H}}$

Combine to: impedance of free space:

$$Z_0 = \sqrt{\mu_0/\varepsilon_0} = \mu_0 c = \frac{2\alpha h}{e^2} \propto t_{\mathrm{H}}$$

Maybe measurable in 10^{th} significant digit after 500 days?

(Or in 9^{th} after 5000 days).

Planck constant related CODATA 1998..2018 values (*I apologise for the small font*!)

2023-11-01: CODATA 2022 not yet available.

Source: https://physics.nist.gov/cuu/Constants/index.html (data formats below are as in those files)
Presumed Hubble constant for 1998: 71.00 km/s/Mpc, corresponding Hubble time: **434 6**02 476 262 984 770 seconds ≈ 13.77e+9 years.

const.	year	value	uncert.	unit	rel.delta	cum.rel.D	cum.rel.D.tH	cum.ratio	
G	1998	6.673e-11	1e-2	m^3 /kg /s^2					
	2002	6.6742e-11	1e-3	m^3 /kg /s^2	+1.80e-4	+1.80e-4	+2.90e-10	619000	
	2006	6.67428e-11	6.7e-4	m^3 /kg /s^2	+1.20e-5	+1.92e-4	+5.81e-10	330000	
	2010	6.67384e-11	8e-15	m^3 /kg /s^2	-6.59e-5	+1.26e-4	+8.71e-10	144000	
	2014	6.67408e-11	3.1e-15	m^3 /kg /s^2	+3.60e-5	+1.62e-4	+1.16e-9	139000	
	2018-2019	6.6743e-11	1.5e-15	m^3 /kg /s^2	+3.30e-5	**+1.95e-4**	**+1.45e-9**	**134000**	>>> 1
h	1998	6.62606876e-34	5.2e-7	J s					
	2002	6.6260693e-34	1.1e-6	J s	+8.15e-8	+8.15e-8	+2.90e-10	281	
	2006	6.62606896e-34	3.3e-7	J s	-5.13e-8	+3.02e-8	+5.81e-10	52	
	2010	6.62606957e-34	2.9e-41	J s	+9.21e-8	+1.22e-7	+8.71e-10	140	
	2014	6.62607004e-34	8.1e-42	J s	+7.09e-8	+1.93e-7	+1.16e-9	166	
	2018-2019	6.62607015e-34	**(exact)**	J /Hz	+1.66e-8	**+2.10e-7**	**+1.45e-9**	**144**	>> 1
1/KJ	1998	2.067833636e-15	8.1e-25	1/(Hz /V)					
	2002	2.067833718e-15	1.8e-24	1/(Hz /V)	+3.97e-8	+3.97e-8	+2.90e-10	137	
	2006	2.067833666e-15	5.1e-25	1/(Hz /V)	-2.51e-8	+1.45e-8	+5.81e-10	25.0	
	2010	2.067833756e-15	4.7e-23	1/(Hz /V)	+4.35e-8	+5.80e-8	+8.71e-10	66.6	
	2014	2.0678338310e-15	1.3e-23	1/(Hz /V)	+3.63e-8	+9.43e-8	+1.16e-9	81.2	
	2018-2019	2.0678338485e-15	**(exact)**	1/(Hz /V)	+8.46e-9	+1.03e-7	+1.45e-9	70.8	>> 1
RK	1998	2.5812807572e+4	9.5e-5	Ohm					
	2002	2.5812807449e+4	8.6e-5	Ohm	-4.77e-9	-4.77e-9	+2.90e-10	-16.4	
	2006	2.5812807557e+4	1.8e-5	Ohm	+4.18e-9	-5.81e-10	+5.81e-10	-1	
	2010	2.58128074434e+4	8.4e-6	ohm	-4.40e-9	-4.98e-9	+8.71e-10	-5.72	
	2014	2.58128074555e+4	5.9e-6	ohm	+4.69e-10	-4.51e-9	+1.16e-9	-3.88	
	2018-2019	2.581280745e+4	**(exact)**	ohm	-2.13e-10	**-4.73e-9**	**+1.45e-9**	**-3.25**	< -1
1/R	1998	9.11267050550085e-8	6.9e-21	1/(/m)					
	2002	9.11267050552078e-8	6.1e-21	1/(/m)	+2.19e-12	+2.19e-12	+2.90e-10	7.53e-3	
	2006	9.11267050551911e-8	6.1e-21	1/(/m)	-1.83e-13	+2.00e-12	+5.81e-10	3.45e-3	
	2010	9.11267050550915e-8	4.6e-19	1/(/m)	-1.09e-12	+9.11e-13	+8.71e-10	1.05e-3	
	2014	9.11267050553489e-8	5.4e-19	1/(/m)	+2.82e-12	+3.74e-12	+1.16e-9	3.22e-3	
	2018-2019	9.11267050582388e-8	1.7e-19	1/(/m)	+3.17e-11	+3.54e-11	+1.45e-9	2.44e-2	~ 0
Z0	1998	3.76730313461e+2	(exact)	Ohm					
	2002	3.76730313461e+2	(exact)	Ohm	0.00e+0				
	2006	3.76730313461e+2	(exact)	Ohm	0.00e+0				
	2010	3.76730313461e+2	(exact)	ohm	0.00e+0				
	2014	3.76730313461e+2	(exact)	ohm	0.00e+0	since 2014:			
	2018-2019	3.76730313668e+2	5.7e-8	ohm	+5.49e-10	**+5.49e-10**	**+2.90e-10**	**1.89**	~ 1

$\boldsymbol{G}$ grows $134\,000\times$ faster than t_{H}; $1/\boldsymbol{K_{\mathrm{J}}} = h/2e$ grows $71\times$ faster than t_{H};

$\boldsymbol{h}$ grows $144\times$ faster than t_{H}; $\boldsymbol{R_{\mathrm{K}}} = h/e^2$ **should grow but shrinks**;

$Z_0 \propto t_{\mathrm{H}}$ seems plausible; $\boldsymbol{R}$ (Rydberg) $= \frac{m_{\mathrm{e}} e^4}{8ch^3\varepsilon_0^2} = \frac{\alpha^2 c m_{\mathrm{e}}}{2h} = \frac{\alpha^2 c m_{\mathrm{e}}}{2\Delta m_{\mathrm{u}} c^2 t_{\mathrm{H}}} = \frac{\alpha^2}{2c} \cdot \frac{m_{\mathrm{e}}}{\Delta m_{\mathrm{u}}} \cdot \frac{1}{t_{\mathrm{H}}}$ appears rather constant.

Recent history of μ_0:

pre-2019: ***defined***: $4\pi \times 10^{-7}$ H/m

CODATA 2018: ***measured***: $4\pi \times 1.000\ 000\ 000\ \mathbf{55(15)} \times 10^{-7}$ H/m
https://www.physics.nist.gov/cuu/pdf/wall_2018.pdf

later: ***measured***: $4\pi \times 1.000\ 000\ 000\ \mathbf{82(20)} \times 10^{-7}$ H/m

earliest I could find:	2021-07-31:	https://physics.stackexchange.com/ [13]
other mentioning:	2022-08-17:	https://www.turito.com/blog/physics/mu-naught-value
as well as:	2023-07-31:	https://testbook.com/physics/mu-naught-value

Latest **change**: $\mathbf{27 \times 10^{-11}}$
exceeds CODATA 2018 ***tolerance*** of: $\mathbf{15 \times 10^{-11}}$ by **80%**

Timestamps: $f_{\mu_0} = 1 + 55(15) \times 10^{-11}$: **2018-01-01** [14]
$f_{\mu_0} = 1 + 82(20) \times 10^{-11}$: **2021-01-01** [14]

[13] Full URL: https://physics.stackexchange.com/questions/656484/is-relative-permeability-mu-0-still-4-pi-times-10-7-h-m
it refers to WikipediA as of 2021-07-31;

[14] Chosen/guessed/assigned by myself; I have no knowledge of exact dates of measurement.

Comparing last two ***measured*** values (2021 & 2018):

Δf_{μ_0}:	$27(**) \times 10^{-11}$	in $\Delta t = \mathbf{3}$ years
speed $= \Delta f_{\mu_0}/\Delta t$:	2.851×10^{-18} /s	$\approx 0.090\ 00$ /Ga
AGE $= f_{\mu_0,2021}$/speed:	3.507×10^{17} seconds	$\approx \mathbf{11.11\ Ga}$

Comparing **2018** value **plus $\mathbf{0.15 \times}$ *tol.*** & **2021** value **minus $\mathbf{0.15 \times}$ *tol.***:

f_{μ_0}:	2018:	$\mathbf{1.000\ 000\ 000\ 5725}$	2021:	$\mathbf{1.000\ 000\ 000\ 79}$
Δf_{μ_0}:		21.75×10^{-11}		in $\Delta t = \mathbf{3}$ years
speed $= \Delta f_{\mu_0}/\Delta t$:		2.297×10^{-18} /s		$\approx 0.072\ 50$ /Ga
AGE $= f_{\mu_0,2021}$/speed:		4.354×10^{17} seconds		$\approx \mathbf{13.79\ Ga}$

***AGE* of universe**: 4.346×10^{17} seconds $\approx \mathbf{13.77\ Ga}$

Do **YOU**  believe this is a coincidence?

Jedenfalls bin ich überzeugt, daß der Alte nicht würfelt.

In any case, I am convinced the "old one" does not throw dice.

— Albert Einstein (in a letter to Max Born, 1926-12-04) —

IF: $\mu_0 \propto t_{\mathrm{H}}$ (plausible by induction, as just shown)

and: $c =$ *truly constant* (see p.6)

then: $\varepsilon_0 = \frac{1}{\mu_0 c^2} \propto 1/t_{\mathrm{H}}$

IF: $\varepsilon_0 \propto 1/t_{\mathrm{H}} \wedge h \propto t_{\mathrm{H}}$

and: $e =$ *truly constant* (cons'd quantity like mass)

then: $\alpha = \frac{e^2}{2\varepsilon_0 hc} =$ *truly constant*

as already presumed (p.125)
because it is dimensionless.

CONJECTURE: $h = \Delta m_{\mathrm{u}} c^2 t_{\mathrm{H}} = \Delta E_{\mathrm{u}} t_{\mathrm{H}}$

Elimination of another "*fundamental constant*"?

$$h = \Delta m_{\mathrm{u}} c \cdot D_{\mathrm{H}}$$

$$\Delta m_{\mathrm{u}} c = \frac{hH}{c} = p_{\gamma|\nu=H}$$

$=$ momentum of photon with lowest possible energy;

$$h = p_{\gamma|\nu=H} \cdot D_{\mathrm{H}}$$

$=$ angular momentum of this (nonexistent) minimal photon,

circling us at $r = D_{\mathrm{H}}$ with $\nu = \frac{c}{2\pi D_{\mathrm{H}}} = \frac{1}{2\pi t_{\mathrm{H}}} = \frac{H}{2\pi}$ or $\omega = \frac{1}{t_{\mathrm{H}}} = H$

3S: imaginary minimal photon would reside in antipodal point, slowly spinning around all possible axes at the same time, desperately trying to escape; but in which direction?

Moreover, it must leave at $\boldsymbol{\beta} = \frac{\boldsymbol{\beta}_{\mathbf{AP}} - \boldsymbol{\beta}_{\mathbf{ph}}}{1 - \boldsymbol{\beta}_{\mathbf{AP}} \cdot \boldsymbol{\beta}_{\mathbf{ph}}} = \frac{1-1}{1-1 \cdot 1} = \frac{0}{0} = ?$

SI base unit: kilogram (kg)

The kilogram, symbol kg, is the SI unit of mass. It is defined by taking the fixed numerical value of the Planck constant h to be 6.626 070 15 x 10^{-34} when expressed in the unit J s, which is equal to kg m^2 s^{-1}, where the metre and the second are defined in terms of c and $\Delta\nu_{Cs}$.

$$1\ \text{kg} = \frac{299\,792\,458^2}{9\,192\,631\,770 \cdot \mathbf{6.626\,070\,15\times10^{-34}}} \cdot \frac{h \cdot \Delta\nu_{Cs}}{c^2}$$

But, very plausibly, we have: $h \propto t_H$.

I would prefer to define the kilogram by fixing the rest mass of for example **a proton to the most accurate value we can measure**

and to return h to the realm of measured quantities.

$$1\ \text{kg}_{HR} = m_p / 1.672\,621\,923\,69 \times 10^{-27}$$ (CODATA 2018)

Newton: *mass* := quantitas materiæ = amount of *matter, stuff*.

PRESUME truly constant fundamental units

for ***acceleration***: $\Delta \boldsymbol{a_u}$

& ***velocity***: $\Delta \boldsymbol{v_u}$

Then we could define: $\Delta t_u := \Delta v_u / \Delta a_u$

as well as: $\Delta l_u := \Delta v_u^2 / \Delta a_u$

It seems obvious to define: $\Delta v_u := c$

as well as: $\Delta a_u := \Delta \boldsymbol{F_u} / \Delta m_u$

where $\Delta \boldsymbol{F_u}$ should be some truly constant unit of *force*.

I opt for a *force* because that is a *physical* quantity and not *kinematic*.

It would yield: $\Delta \boldsymbol{l_u} = \boldsymbol{c^2} \Delta \boldsymbol{m_u} / \Delta \boldsymbol{F_u} = \Delta \boldsymbol{E_u} / \Delta \boldsymbol{F_u}$

and (of course): $\Delta \boldsymbol{t_u} = \boldsymbol{c} \Delta \boldsymbol{m_u} / \Delta \boldsymbol{F_u} = \Delta \boldsymbol{l_u} / \boldsymbol{c}$

I have not yet found such a $\Delta \boldsymbol{F_u}$, keeping in mind that $\{G, h, k_e\}$ are *not* truly constant, but proportional to t_H.

OR: $\Delta \boldsymbol{F_u} := \Delta \boldsymbol{E_u} / \Delta \boldsymbol{l_u} = c^4 / 2G = M_U c / t_H = \boldsymbol{4\pi / \kappa} \approx 6.05 \times 10^{43}$ N

or: $\Delta \boldsymbol{F_u} := \Delta \boldsymbol{E_u} / \boldsymbol{D_H} = hH / (c/H) = hH^2 / c \approx 1.17 \times 10^{-77}$ N

I think a truly constant unit of *force* does not exist.

FABRICATED ASSUMPTION:

SOMETHING born at hyper centre could expand 3-spherically
& "bump" against hyper inner surface of 3S-cosmos:

fully synchronous event throughout entire cosmos without any signal traversing its 3D interior.

Elementary particles (or whatever entities) "feel" it?

Recurrance ⇒ quantised cosmic expansion?

Absolute time unit from outside the universe?

Clock ticks of "hyper time"?

CONTINUED FABRICATION:

Hyper time tick interval

independent of both M_{U} and t_{H} .

Ticks would enter cosmos perpendicular
to all dimensions we can perceive.

Entangled particles:

quantum properties might resonate with it,
synchronised in exact counterphase

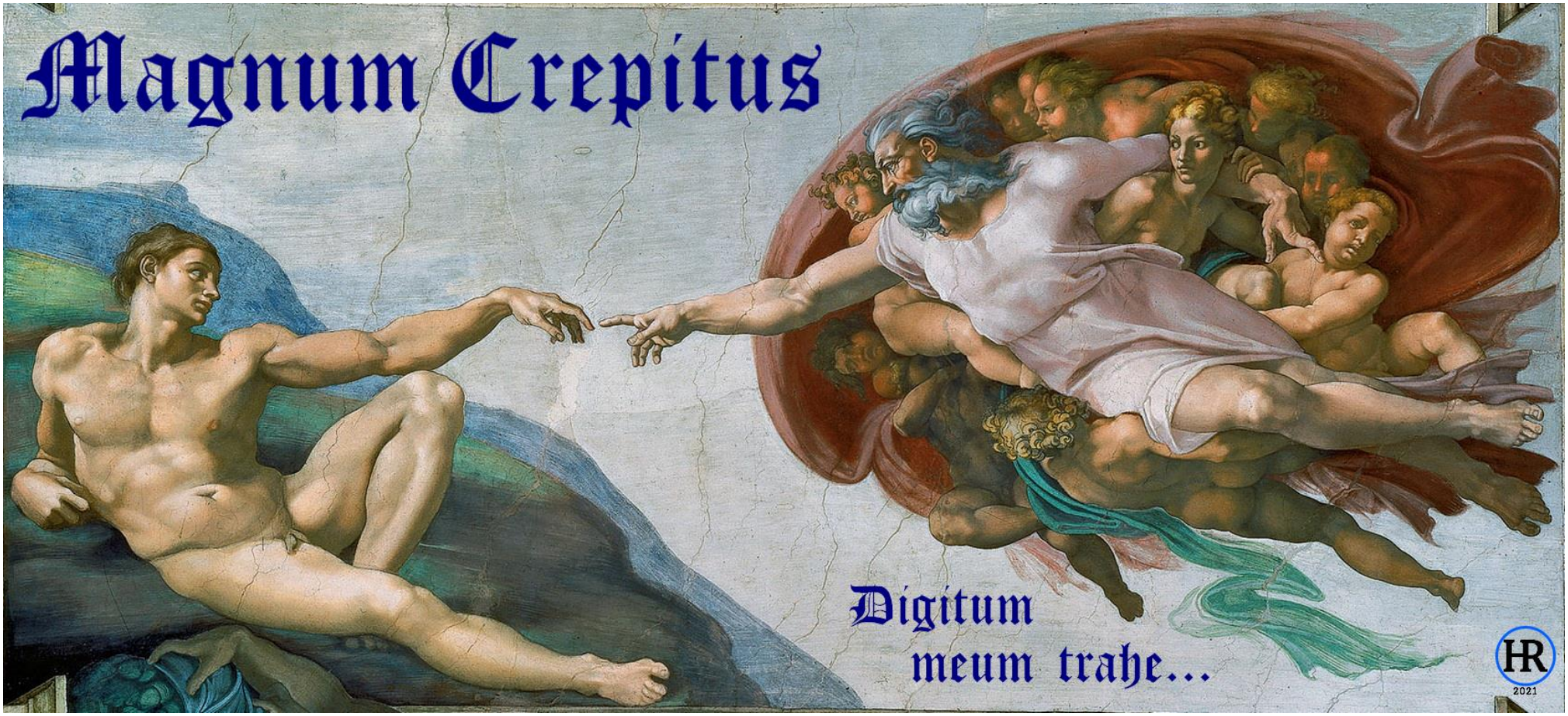
without SPOOKY ACTION at a distance.

¿ Eccentric experiments ⇒ hyper tick duration ?

If you wish to make
an apple pie from scratch,
you must first invent
the universe.

Carl Sagan

The very beginning



Michelangelo Buonarroti, La Creazione di Adamo, 1511,
Cappella Sistina, musei Vaticani, Roma

BIG BANG:

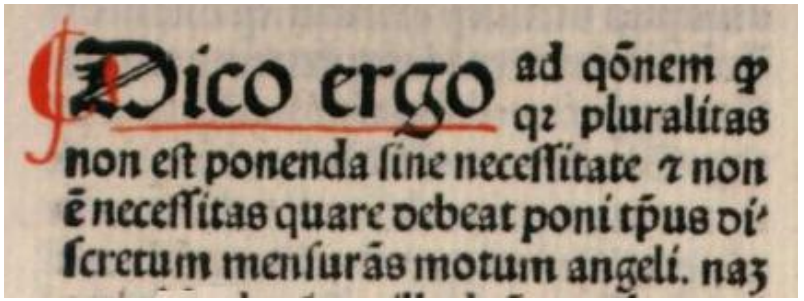
- not only $t = 0$ (to me, 10^{-10x} s "after the BB" is a rather silly concept),
- but the whole occurrance from $t = 0$ until the cosmos consisted of p & e, 12.5% n, and a load of γs & νs.

I.e. not only the ignition,
but the entire explosion.

William of Ockham

(...) because plurality
is not to be posited
without necessity (...)

John Duns Scotus



Occam's razor: (if assumptions are inevitable, then choose the simplest that suffices and no more than that)

If multiple conclusions possible, choose only most plausible.

Hubble-Lemaître law in reverse ⇒
universe once had density of neutronium
and then it plausibly *was* neutronium;

"***IniAll***" ≔ entire initial cosmos,
consisting of neutrons.

I consider any consideration considering
anything further back in time a
senseless extrapolatio ad absurdum.

IniAll

Presumption: neutrons had same radius as today.

IF close-packed neutronium: $\rho_{\mathrm{n,cp}} = 5.8 \times 10^{17}$ kg/m^3

then volume of ***IniAll***: $V_{IniAll} = \frac{M_{\mathrm{U}}}{\rho_{\mathrm{n,cp}}} \approx 1.5 \times 10^{35}$ m^3

Euclidean radius: $R_{IniAll} = \sqrt[3]{\frac{3V_{IniAll}}{4\pi}} \approx 3.3 \times 10^{11}$ m ≈ 2.2 au

3-spherical: $V_{IniAll} = 2\pi^2 R_{\mathrm{hyp}}^3$

$\therefore$ $R_{hyp} = \sqrt[3]{\frac{V_{IniAll}}{2\pi^2}} \lesssim 1.97 \times 10^{11}$ m

primordial Hubble distance: $D_{\mathrm{H},IniAll} = \pi \cdot R_{hyp} \approx 6.19 \times 10^{11}$ m $\approx$ **4.14 au**

primordial Hubble time: $t_{\mathrm{H},IniAll} = D_{\mathrm{H},IniAll}/c \approx$ **00:34:25**

¿ 

?

No ascertained truth, but the simplest I can think of:

FABRICATED ASSUMPTION:

Genesis of *IniAll*:

No hot quark-gluon plasma or so, but cold[15] tangible matter:

SOMETHING consecutively expelled a huge load of neutrons

at a rate that leaves their initial mutual distance out of reach of the strong nuclear force (i.e. $r \gtrsim 2.5$ fm $\approx \mathbf{3}r_{\mathrm{n}}$), allowing them to decay,

yielding: $D_{\mathrm{H},IniAll} \approx 1.86 \times 10^{12}$ m ≈ 12.4 au

& $t_{\mathrm{H},IniAll} = D_{\mathrm{H},IniAll}/c \approx 6194$ s $= 01{:}43{:}12 \approx 10t_{½,n}$

¿ 

?

[15] I mean a few orders below the *Hagedorn temperature* of 158 MeV $\times \frac{2}{3k_{\mathrm{B}}} \approx 1.2$ TK.

Straight forward reasoning:

Hubble-Lemaître backwards → density of neutronium;

Occam's razor → it *was* neutronium;

majority of ***IniAll***'s neutrons not observed today;

⇒ no longer exist ⇒ must have decayed.

$E_n = 0.78257$ MeV $= 1.2538 \times 10^{-13}$ J per neutron;

(total: $E_{\mathrm{U},i} \approx E_n . N_{\mathrm{U}} \approx 6.57 \times 10^{66}$ J).

Roughly $50\% = E_n/2 \approx 390$ keV taken by antineutrino,

yielding same mean $\bar{\nu}_e$ density as nucleons in universe:

$37.5/\text{m}^3$ (see p. 82) $\rightarrow \sim 1.4 \times 10^{-12}$ J/m^3 $\approx 56 \cdot \rho_{E,\text{CMB}}$,

(not corrected for decaying neutron receding from us in Hubble flow, which may significantly lower $\bar{\nu}_e$ velocity w.r.t. us, hence its energy).

Cf. solar neutrino energy: ≤ 400 keV

solar neutrino flux: $\sim 7 \times 10^{14}/\text{m}^2/\text{s}$

presuming a velocity of: $299\,792\,457$ m/s $\lesssim c$

we find their density: $2.3 \times 10^6/\text{m}^3$

$\rightarrow \sim 1.5 \times 10^{-8}$ J/m^3 $\approx 3.5 \times 10^6 \cdot \rho_{E,\text{CMB}} \gg$ above.

https://neutrinos.fnal.gov/sources/big-bang-neutrinos:

(*probably using wrong premises, such as flat universe etc.*)

big bang neutrinos: 300 mln./m^3; very low-energy; impossible to find;

$T \approx 2$ K $\rightarrow 0.26$ meV (*not* MeV! *Gigantic difference!*).

INTERMEZZO (2023-08-01):

Neutrino mass (i.e. rest energy):

$$E_{0,\nu} < 0.120 \text{ eV}$$ (https://en.wikipedia.org/wiki/Neutrino)

neutron decay: $E_n \approx 0.78257 \text{ MeV}, \quad E_{\overline{\nu}} \approx \frac{E_n}{2}, \quad \gamma_{\overline{\nu}} = \frac{E_{\overline{\nu}}}{E_{0,\nu}} = \frac{E_n}{2E_{0,\nu}}$

S.R.: $\beta = \sqrt{1 - \frac{1}{\gamma^2}} = 1 - \frac{1}{2\gamma^2} - \mathcal{O}\left(\frac{1}{\gamma^4}\right) \quad \therefore \beta_{\overline{\nu}} \approx 1 - \frac{2E_{0,\nu}^2}{E_{\overline{\nu}}^2}$

IF $E_{0,\nu} = 0.120$ eV: $\beta_{\overline{\nu}} \approx 1 - 4.70 \times 10^{-14}$

just found: $\beta_{\text{CMBsrc}} \approx 1 - 1.65 \times 10^{-18}$

Big bang neutrino velocity in *our* frame:

$$\beta'_{\overline{\nu}} = \frac{\beta_{\text{CMBsrc}} - \beta_{\overline{\nu}}}{1 - \beta_{\text{CMBsrc}}\beta_{\overline{\nu}}} \approx +0.99993$$ **AWAY from us!**

They can't keep up with cosmic expansion! Most neutrinos from neighbouring decaying neutrons during decay of ***IniAll*** already passed us very long ago and are no longer observable, those from farther away (i.e. near our antipodal point at that moment) are going in the wrong direction for observation by us. They seem to be chasing their mother...

Decay of ***IniAll***

$\frac{1836.15}{1837.15}$ of remaining $E_n/2$ taken by electron;

primordial (electron) temperature of cosmos:

$$\boldsymbol{T_{\mathrm{U},i} \approx \frac{2}{3k_{\mathrm{B}}} \cdot \frac{E_n}{2} \approx 3 \times 10^9\ \mathrm{K}}$$

≈ 391 keV/electron $\approx 0.766\, m_{\mathrm{e}}c^2$/electron.

Initial temperature of cosmos:

$T_{U,i} \approx 3$ GK

You think it was hotter?

Please substantiate that

without contriving ***any*** concoction

& explain where the energy has gone!

Primordial nucleosynthesis

Initially: $\boldsymbol{T_{electron} \approx 3\ \text{GK},\ T_{proton} \approx 1.6\ \text{MK}.}$

If $E_{\mathrm{U},i}/2$ evenly distributed over p & e: $\boldsymbol{T^*_{\mathrm{U},i} \approx 1.5\ \text{GK}}$.

Maybe ***IniAll*** already was of $\mathcal{O}(1\ \text{GK})$?

When $r = 3r_{\mathrm{n}}$: $V_{IniAll} = \frac{2D_{\mathrm{H}}^3}{\pi} \approx 4.1 \times 10^{36}\ \text{m}^3 \approx (10.7\ \text{au})^3$

(spacious cube around Saturn's orbit);

initial nucleon density: $\sim 1.5 \times 10^{43}/\text{m}^3 \approx 25 \times 10^{18}\ \text{mol/m}^3$

(cf. sun's core: $\sim 150 \times 10^6\ \text{mol/m}^3$)

Primordial deuterium? Plenty primordial neutrons!

(But I cannot substantiate 25% He in a simple way).

How does $h \approx 0$ affect nucleosynthesis?

Lorentz (in)variance of temperature?

A. Einstein (1907): $T_{\mathrm{stat}} = T_{\mathrm{mov}}/\gamma$;

moving body would be cooler for stationary observer;

H. Ott (1963): $T_{\mathrm{stat}} = T_{\mathrm{mov}} \cdot \gamma$;

moving body would be warmer for stationary observer;

P.T. Landsberg (1966): $T_{\mathrm{stat}} = T_{\mathrm{mov}}$;

moving body would have same temperature for both;

H. Reints (2022):

compact body: rel. Doppler-Wien: $T_{\mathrm{stat}} = T_{\mathrm{mov}} \cdot \sqrt{\frac{1 \mp \beta}{1 \pm \beta}}$

sparse body: "adiabatic Lorentz compression":

$T_{\mathrm{stat}} V_{\mathrm{stat}}^{2/3} = T_{\mathrm{mov}} V_{\mathrm{mov}}^{2/3}$; $V_{\mathrm{stat}} = V_{\mathrm{mov}}/\gamma$: $T_{\mathrm{stat}} = T_{\mathrm{mov}}/\sqrt[3]{1-\beta^2}$

$= T_{\mathrm{mov}} \cdot \gamma^{2/3}$

(as well as Doppler-Wien)

Stefan-Boltzmann: $j^* = \sigma T^4$

Wien: $\lambda_{\text{peak}} = b/T$

Inhomogeneous ⇒ smeared out spectrum;

T^4 causes highest temp. to predominate;

the hotter, the more it seems at *one* temp.;

CMB nearly perfectly matches Planck's law,

∴ emitted at one (high) temperature[16];

∴ CMB must be coming from primordial plasma at $T_{\text{U},i} \approx 3$ GK

yielding redshift: $\zeta = \frac{T_{\text{U},i}}{T_{\text{CMB}}} \approx 1.1 \times 10^9$.

[16] See http://henk-reints.nl/astro/HR-Planck-law-expansion-CMB.pdf

Doppler effect: $\nu_{\text{obs}} = \nu_{\text{em}} \frac{1}{1+\beta} \sqrt{1-\beta^2}$

independent of time or distance;

⇒ does not occur whilst light is propagating;

⇒ **merely a difference in local frames;**

Einstein's Nobel Prize:

photons do not change while propagating (in observer's frame);

Einstein's postulates:

speed of light always same value to every observer,

no matter the velocity of the light source w.r.t. him.

∴ Hubble flow (= cosmic expansion)

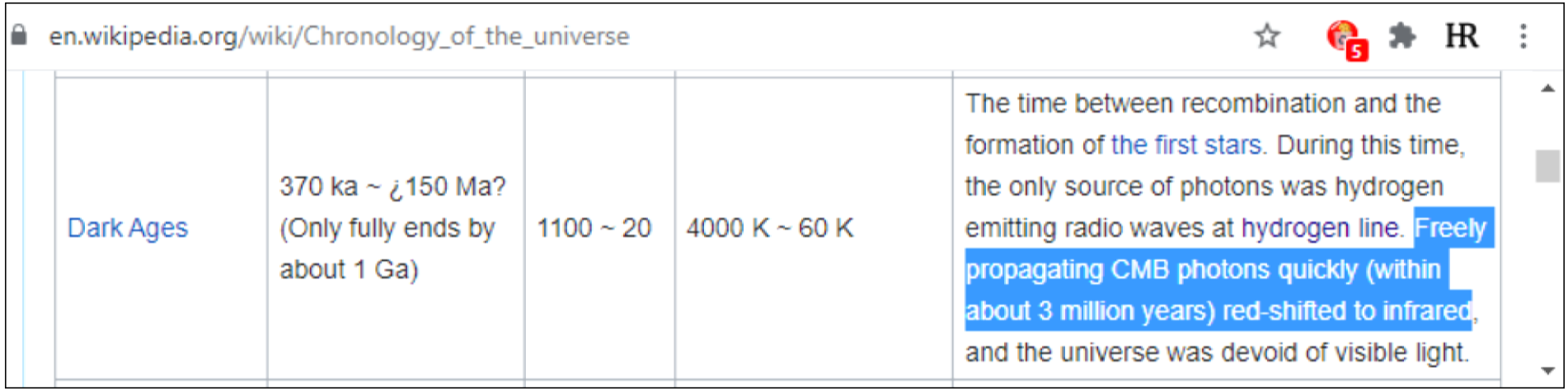
cannot and ***does not*** affect oncoming photon

(said otherwise: cosmological redshift is a FICTION[17]).

[17] http://henk-reints.nl/astro/HR-Hubble-Lemaitre-slideshow.pdf

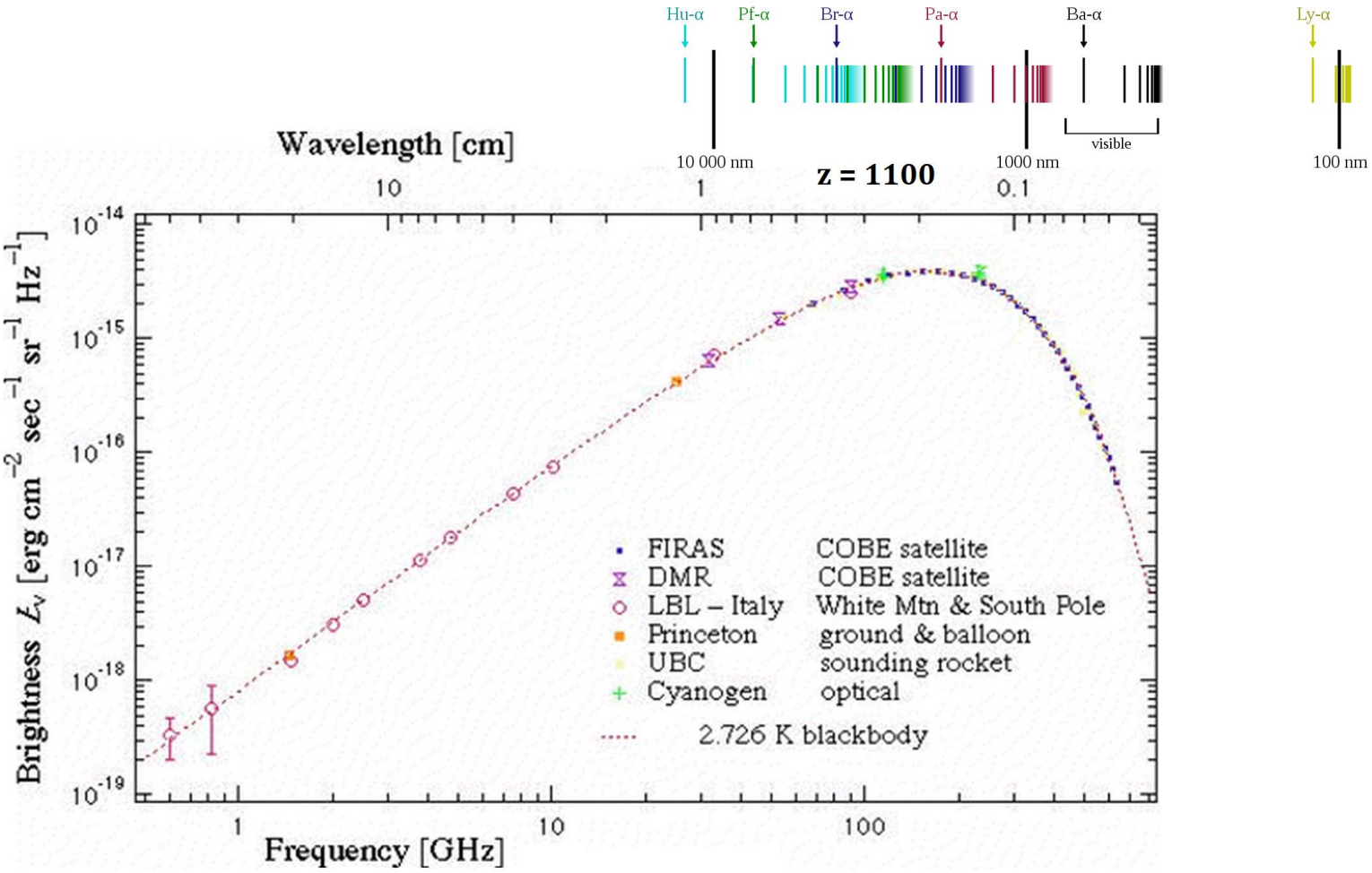
Observed CMB photons must
in *our* frame *always* have had the very
same frequency ever since they were emitted,
already Doppler shifted at the moment of emission.

https://en.wikipedia.org/wiki/Chronology_of_the_universe:



"Freely propagating CMB photons quickly red-shifted to infrared";
Nope, they've always been what we observe today.

CMB contains no hydrogen spectrum at $z \approx 1100$:



contradicts CMB from recombination.

Hydrogen line: $21\ \text{cm} \times 1100 = 231\ \text{m}$. Observed?

Simple adiabatics of post-***IniAll*** gas/plasma:

$T \cdot V^{2/3} = constant$ (presuming a monatomic ideal gas)

$\therefore$ $\boldsymbol{D_{\mathrm{H,recomb}}} = \boldsymbol{D_{\mathrm{H},i}} \cdot \sqrt{T_{\mathrm{U},i}/T_{\mathrm{rec}}}$ $(T_{\mathrm{rec}} = 3000\ \mathrm{K})$

$= 12.5\ \mathrm{ly} \cdot \sqrt{3 \times 10^9/3000}$

$\approx \mathbf{12\ 500\ ly}$

$\Rightarrow \rho_{\mathrm{H}_2} = \frac{5.24\times10^{79}}{2} / \left(2D^3_{\mathrm{H,recomb}}/\pi\right)$

$\approx 2.5 \times 10^{19}/\mathrm{m}^3 \approx 41\ \mu\mathrm{mol}/\mathrm{m}^3$

$p = \rho_{\mathrm{H}_2} kT_{\mathrm{rec}} \approx 1.0\ \mathrm{Pa}$

$\therefore$ $\boldsymbol{t_{\mathrm{recomb}}} = \mathbf{12\ 500\ years}$

Standard BB ~~theory~~ fiction[18]:

42 Mly in (18⇔370) ka

$\approx (2333 \Leftrightarrow 110)c$ 🤔

and it lasted ~100 ka

(which of course equals $370 - 18$).

Ceterum censeo superluminalitatem esse delendam.

[18] https://en.wikipedia.org/wiki/Chronology_of_the_universe (as of 2021-08-15)

https://en.wikipedia.org/wiki/Thomson_scattering#Examples_of_Thomson_scattering:

"The cosmic microwave background contains a small linearly-polarized component attributed to Thomson scattering."

https://en.wikipedia.org/wiki/Cosmic_microwave_background#Polarization:

"The cosmic microwave background is polarized at the level of a few microkelvin."

It seems Thomson scattering of CMB not very large.

Thomson scattering does not modify photon frequency.

Scattering does not contradict CMB from primordial plasma.

Scattering merely yields a blurred image.

IF $h \propto t_{\mathrm{H}}$ then, as long as $t_{\mathrm{H}} \approx 0$:

Compton wavelength: $\lambda_{\mathrm{C}} = \frac{h}{mc} \approx 0$

Thomson cross section: $\sigma_{\mathrm{T}} = \frac{2}{3\pi}(\alpha\lambda_{\mathrm{C}})^2 \approx 0^2$

$\Rightarrow$ hardly any CMB scattering in very early universe!

But also: Wien's constant $b \propto t_{\mathrm{H}}$ ...

Scattered CMB photons went astray:

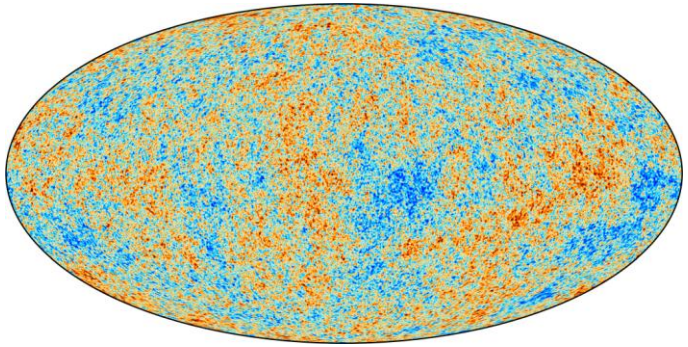
they no longer are on a geodesic

from ***very near the AP*** to ***HERE*** & ***NOW***;

scattered CMB photons are the light that did not yet have time to reach us

⇒ only nonscattered fraction observable;

⇒ sharp image of true CMB source:



$$T_{\mathrm{U},i} = 3\times10^{9}\ \mathrm{K}$$ yields:

CMB redshift: $\zeta_{\mathrm{CMB}} = \frac{T_{\mathrm{U},i}}{T_{\mathrm{CMB}}} = \frac{3\times10^{9}}{2.7255} \approx 1.1\times10^{9}$;

$\beta_{\mathrm{CMBsrc}} = \frac{\zeta_{\mathrm{CMB}}^{2}-1}{\zeta_{\mathrm{CMB}}^{2}+1} = 1-\frac{2}{\zeta_{\mathrm{CMB}}^{2}+1} \approx 1-1.65\times10^{-18}$;

$\gamma_{\mathrm{CMBsrc}} = 1/\sqrt{1-\beta_{\mathrm{CMBsrc}}^{2}} = \frac{\zeta_{\mathrm{CMB}}^{2}+1}{2\zeta_{\mathrm{CMB}}} \approx \frac{\zeta_{\mathrm{CMB}}}{2} \approx 5.5\times10^{8}$;

CMB source's apparent age in *our* frame:

$t'_{\mathrm{CMBsrc}} = \frac{t_{\mathrm{H}}}{\zeta_{\mathrm{CMB}}} \approx \frac{13.77\times10^{9}}{1.1\times10^{9}}$ years ≈ 12.5 years;

$\Rightarrow 01{:}45 \lesssim$ {***IniAll***'s genesis & decay} $\lesssim 12.5$ years;

its proper age at emission[19] of now observed CMB:

$t_{\mathrm{CMBsrc}} = \left(1-\frac{\zeta_{\mathrm{CMB}}^{2}-1}{2\zeta_{\mathrm{CMB}}^{3}}\right)t_{\mathrm{H}} \cong t_{\mathrm{H}} \approx 13.77$ Ga.

*NOTE: primed values are in **our** frame.*

[19] http://henk-reints.nl/astro/HR-Hubble-Lemaitre-slideshow.pdf

Apparent radius of CMB source: $\rho'_{\mathrm{CMBsrc}} = (1 - \beta_{\mathrm{CMBsrc}})$;
inverse Lorentz contraction (i.e. expansion) to *its* frame:

$r'_{\mathrm{CMBsrc}} = \rho'_{\mathrm{CMBsrc}} \cdot D_{\mathrm{H}} \approx 215\,000$ km in *our* frame;
$r_{\mathrm{CMBsrc}} = \gamma_{\mathrm{CMBsrc}} \cdot r'_{\mathrm{CMBsrc}} \approx \mathbf{12.5}$ **ly** in *its* frame;

CMB source = decayed ***IniAll***: $r_{\mathrm{CMBsrc}} = D_{\mathrm{AP},0}$, primordial density:

$$\rho_{\mathrm{U},i} = \frac{M_{\mathrm{U}}}{V_{\mathrm{U},i}} = \frac{M_{\mathrm{U}}}{2D_{\mathrm{AP}}^3/\pi} = \frac{\pi M_{\mathrm{U}}}{2r_{\mathrm{CMBsrc}}^3} \approx 83.3 \text{ kg/m}^3$$

cf. hydrogen (H_2): liquid: $71_{@\mathrm{bp}} \leftrightarrow 77_{@\mathrm{mp}}$ kg/m^3, solid: 86 kg/m^3

indicative pressure if it were gaseous monatomic H:

$$p_{\mathrm{U},i} = \frac{83.3 \text{ kg/m}^3}{1.008 \text{ amu}} kT_{\mathrm{U},i} \approx 2 \times 10^{15} \text{ Pa} = 20 \text{ Gbar} \ll p_{\mathrm{C},e} \approx 7.3 \times 10^{21} \text{ Pa}.$$[20]

Genesis & decay of ***IniAll*** may have lasted 12.5 years, but no longer.

¿ 

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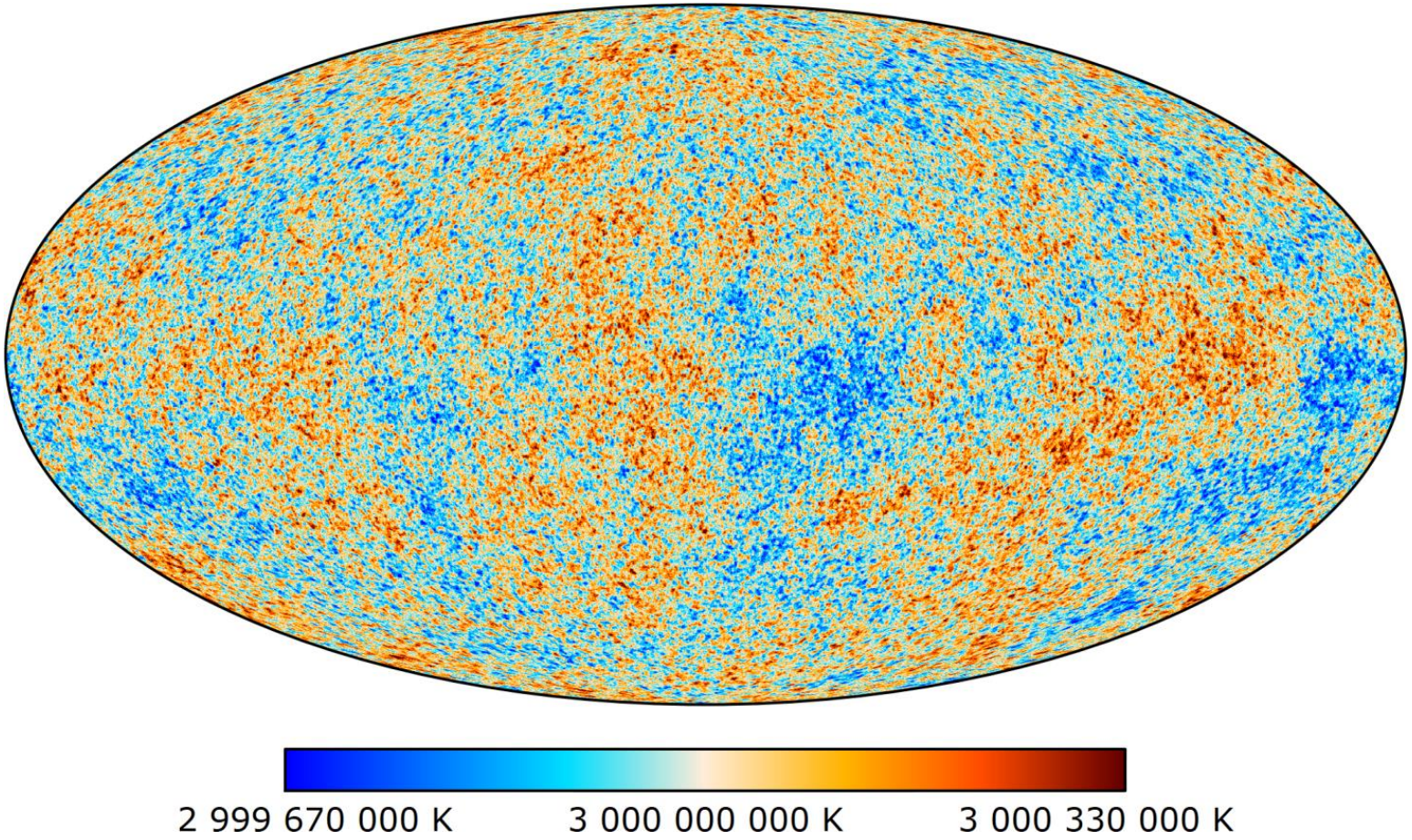
[20] *Electron Compton pressure*, see http://henk-reints.nl/astro/HR-fall-into-black-hole-slides.pdf



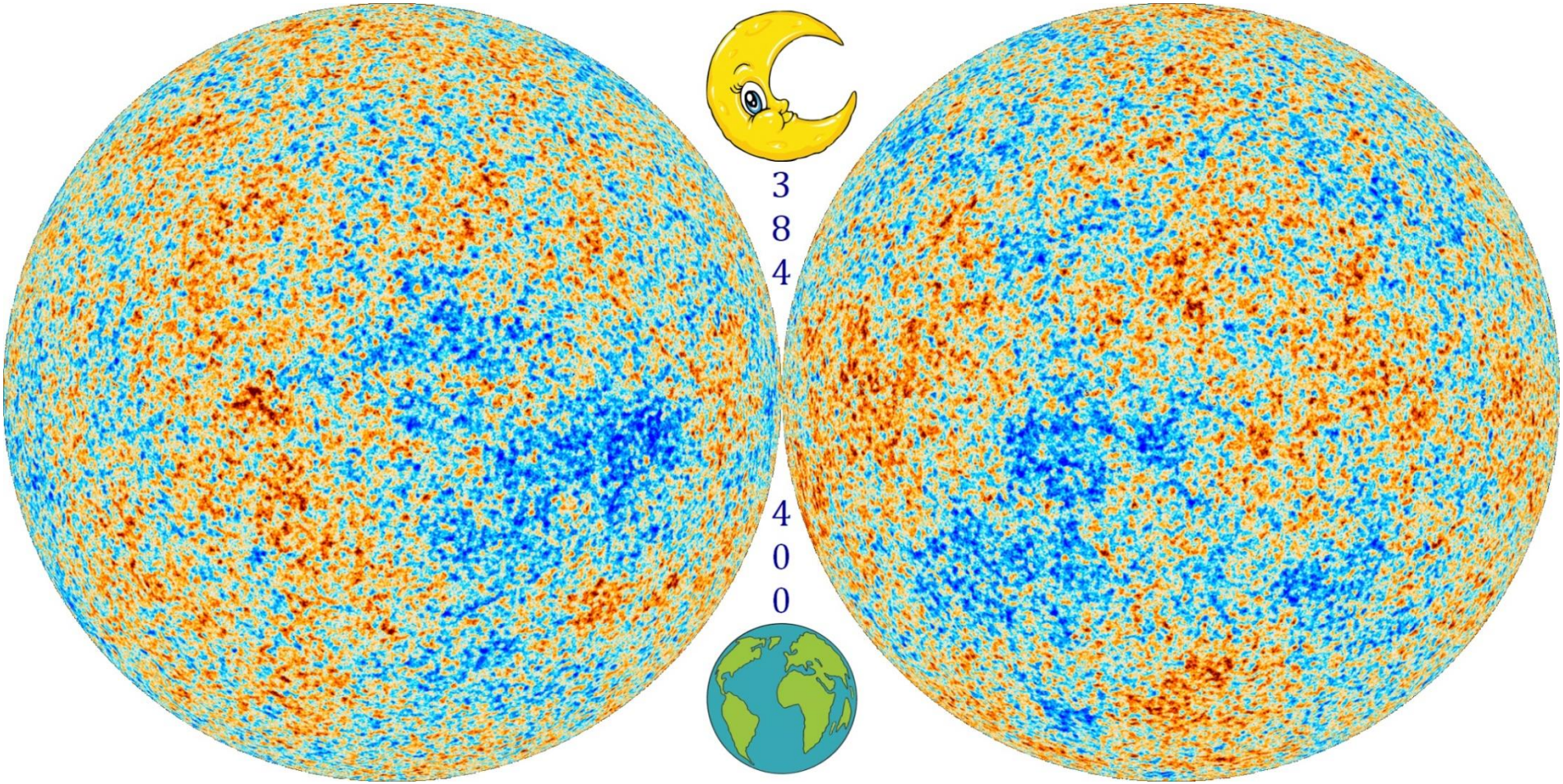
"Bathroom colors": colder = more redshift, hotter = less redshift!

"Normal" temperature fluctuations of $\sim \pm 0.01\%$.

NOT the *inside* of a *large* sphere around *us*, but the *outside* of a *small* sphere around our *AP*, completely surrounded by *us*!

The CMB source is a small sphere;

radius = merely 215 000 km as seen by us.



See also: http://henk-reints.nl/astro/CMBRotate/

At: $R = 215\,000$ km

density in our frame: $\frac{3M_{\mathrm{U}}}{4\pi R^3} \approx 2.11 \times \mathbf{10^{27}}$ kg/m^3

volume at neutron Compton density[21]: $V_{\mathrm{U}@\rho_{\mathrm{C},n}} = \frac{M_{\mathrm{U}}}{\rho_{\mathrm{C},n}} \approx \left(\frac{8.77\times10^{52}}{1.392\times10^{18}} \approx 6.30 \times 10^{34}\right)$ m^3

corr. radius: $R = \sqrt[3]{\frac{3V}{4\pi}} \approx 247 \times 10^6$ km ≈ 1.65 au

Would be no problem

if only EMPTY (tare) distances (i.e. *between* particles) undergo Lorentz contraction,

see http://henk-reints.nl/astro/HR-Twin-paradox-slides.pdf

[21] see http://henk-reints.nl/astro/HR-fall-into-black-hole-slides.pdf

Total electron Compton volume[22]

after decay of ***IniAll***: $V_{\mathrm{U,C}_e} = N_{\mathrm{U}} V_{\mathrm{C}_e} \approx 3.92 \times 10^{44}\ \mathrm{m}^3$

gross volume: $V_{\mathrm{U,C}_e,\mathrm{cp}} = \frac{3\sqrt{2}}{\pi} V_{\mathrm{U,C}_e}$ (close-packing)

3S-geometry: $V_{3S} = \frac{2D_{AP}^3}{\pi} \therefore D_{AP} = \sqrt[3]{\frac{\pi V_{3S}}{2}}$

minimally required after full decay:

$$D_{\mathrm{H},min} = \sqrt[3]{\frac{3N_{\mathrm{U}} \cdot V_{\mathrm{C}_e}}{\sqrt{2}}} \approx 0.099 \text{ ly} \approx 6300 \text{ au},$$

$\therefore$ minimal duration of decay: ~36 days.

¿ 

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Oops, there's no space between "First" and "Three"...!

[22] see http://henk-reints.nl/astro/HR-fall-into-black-hole-slides.pdf

Would 215 000 km be the CMB source's Schwarzschild radius,
then its mass were $\sim 1.48 \times 10^{35}$ kg $\approx 73000 \cdot M_\odot$.

As shown in
http://henk-reints.nl/astro/HR-fall-into-black-hole-slides.pdf

Schwarzschild radius not yet relativistically contracted,
hence more likely: $r_S \stackrel{?}{=}$ uncontracted 12.5 ly, yielding:

$$M_{\mathrm{CMBsrc}} \approx 8 \times 10^{43} \text{ kg} \approx 4 \times 10^{13} \cdot M_\odot$$

Thermal energy at electron temperature of 3 GK:

$$E_{th,e} = \left(\#e = \frac{M_{\mathrm{CMBsrc}}}{m_{\mathrm{H}}}\right) \cdot \frac{3}{2} k_{\mathrm{B}} T \approx 2.98 \times 10^{57} \text{ J};$$

original energy was: $\frac{1}{2} E_{\mathrm{U},i} = \frac{1}{2} \cdot 6.57 \times 10^{66}$ J;

ratio: $1.14 \times 10^{9} \approx \zeta_{\mathrm{CMB}}$.

Seemingly missing a factor of ζ_{CMB} .
But with Mach8, G would be less by that factor & M greater.

decay of ***IniAll***: $E_{\mathrm{U},i} \approx 6.57 \times 10^{66}\ \mathrm{J}$

$$T_{\mathrm{CMBsrc}} = \frac{2}{3k_{\mathrm{B}}} \cdot \frac{E_n}{2} \approx 3 \times 10^{9}\ \mathrm{K}$$

$$T_{\mathrm{CMB}} \approx 2.7255\ \mathrm{K}$$

$$\zeta_{\mathrm{CMB}} = \frac{T_{\mathrm{CMBsrc}}}{T_{\mathrm{CMB}}} \approx 1.1 \times 10^{9}$$

$$\beta_{\mathrm{CMBsrc}} = 1 - \frac{2}{\zeta_{\mathrm{CMB}}^2 + 1} \approx 1 - 1.65 \times 10^{-18}$$

$$\gamma_{\mathrm{CMBsrc}} \approx \frac{\zeta_{\mathrm{CMB}}}{2} \approx 5.5 \times 10^{8}$$

SB: $j^*_{\mathrm{CMBsrc}} = \sigma_{\mathrm{SB}} T^4_{\mathrm{CMBsrc}} \approx 4.59 \times 10^{30}\ \mathrm{W/m^2}$

$$r'_{\mathrm{CMBsrc}} = (1-\beta_{\mathrm{CMBsrc}})D_{\mathrm{H_0}} \approx 215\,000 \text{ km}$$

$$A'_{\mathrm{CMBsrc}} = 4\pi(r'_{\mathrm{CMBsrc}})^2 \approx 5.81\times10^{17} \text{ m}^2$$

$$\boldsymbol{L'_{\mathrm{CMBsrc}} = A'_{\mathrm{CMBsrc}}\cdot j^*_{\mathrm{CMBsrc}} \approx 2.67\times10^{48} \text{ W}}$$

(j^*_{CMBsrc} derived from theoretical decay of ***IniAll*** yielding $T_{\mathrm{CMBsrc}} \approx 3$ GK)

$$A'_{\mathrm{CMBsrc}} = 4\pi(r'_{\mathrm{CMBsrc}})^2 = 4\pi\left(\frac{2D_{\mathrm{H}}}{\zeta^2_{\mathrm{CMB}}+1}\right)^2 = \frac{16\pi D^2_{\mathrm{H}}}{(\zeta^2_{\mathrm{CMB}}+1)^2}$$

$$L'_{\mathrm{CMBsrc}} = A'_{\mathrm{CMBsrc}}\cdot j^*_{\mathrm{CMBsrc}} = \frac{16\pi D^2_{\mathrm{H}}}{(\zeta^2_{\mathrm{CMB}}+1)^2}\cdot\sigma_{\mathrm{SB}}T^4_{\mathrm{CMBsrc}}$$

$$= \frac{16\pi D^2_{\mathrm{H}}}{(\zeta^2_{\mathrm{CMB}}+1)^2}\cdot\sigma_{\mathrm{SB}}\zeta^4_{\mathrm{CMB}}T^4_{\mathrm{CMB}} = 4\pi D^2_{\mathrm{H}}\cdot 4\sigma_{\mathrm{SB}}T^4_{\mathrm{CMB}}\cdot\left(\frac{\zeta^2_{\mathrm{CMB}}}{\zeta^2_{\mathrm{CMB}}+1}\right)^2$$

$$\lim_{\zeta_{\mathrm{CMB}}\to\infty}\frac{\zeta^2_{\mathrm{CMB}}}{\zeta^2_{\mathrm{CMB}}+1} = 1$$

Luminosity of CMB source:

$$L'_{\mathrm{CMBsrc}} = 4\pi D_{\mathrm{H}}^2 \cdot 4\sigma_{\mathrm{SB}} T_{\mathrm{CMB}}^4$$

$$\approx \mathbf{2.67 \times 10^{48}\ W} \quad \approx 7 \times 10^{21} \cdot L_{\odot}$$

(T_{CMB} derived from currently observed CMB, unlike on previous page[23])

$$\mathcal{M}_{\mathrm{bol}} = -2.5 \log_{10} \frac{2.67\times10^{48}}{3.0128\times10^{28}} \approx -49.87$$

We observe it relativistically dimmed, so actually emitted is:

$$L^*_{\mathrm{CMBsrc}} = \zeta_{\mathrm{CMB}} L'_{\mathrm{CMBsrc}} \approx 2.94 \times 10^{57}\ \mathrm{W} \Rightarrow \mathcal{M}^*_{\mathrm{bol}} \approx -72.5$$

Note: with $\boldsymbol{h \propto t_{\mathrm{H}}}$ it would be that $\boldsymbol{\sigma_{\mathrm{SB}} \propto 1/t_{\mathrm{H}}^3}$
which would be **HUGE** at/near very beginning,
but the above uses *current* value, consistent with
observed proper age[24] of CMB source $\approx t_{\mathrm{H}}$.

[23] which confirms ζ_{CMB} is large, and suggests the CMB is hardly attenuated during its journey;

[24] http://henk-reints.nl/astro/HR-Hubble-Lemaitre-slideshow.pdf

Due verità non posson mai contrariarsi.

Two truths cannot ever contradict one another.

Galileo Galilei, letter to Benedetto Castelli, 21 December 1613.

The cosmos appears to be in two minds:

1. CMB must be primordial thermal radiation of decayed ***IniAll*** at 3 GK with *proper age* near zero & *lookback*[25] $\approx t_{\mathrm{H}}$;

(but haven't we found[25] $\Delta\tau_{l,\max} = \frac{1}{2}$?)

2. proper lookback time[25]: $\frac{\zeta^2-1}{2\zeta^3} t_{\mathrm{H}} \approx 6.26$ years,

hence: observed proper age of CMB source $\approx t_{\mathrm{H}}$.

☹ *It seems necs. to use both as a truth, whatever suits best...*

[25] http://henk-reints.nl/astro/HR-Hubble-Lemaitre-slideshow.pdf

Omnis comparatio (2–sphærica) claudicat.

All (2–spherical) comparison is lame.

Suppose light follows the curvature of Earth's surface,
so you can see the entire world without any horizon.

You're at the North Pole & some silly scientist limps away along the 180° meridian, leaving a track behind.

After a while, he[26] will pass the South Pole
& come back to you along the 0° meridian.

Every footprint of his marks a past point in time.

His task @SP: *take a break, Jake, don't forsake, make an opaque stake & place it with no quake.*

It will be named the South Pole Pole (NL: zuidpaal).

[26] A *silly* scientist must be a "he"... 😋

From the NP, you will see this SPP in every direction & it manifests as an opaque wall, all around you, impossible to look through.

The oldest half of the silly scientist's track has become invisible to you, it is blocked by the SPP.

But the entire earth is still visible to you, closer than the SPP, which itself is the farthest point.

Nonetheless, the entire earth is also beyond it, i.e. farther away than this farthest point!

Both are the very same earth, but beyond the SPP, Earth's far end, the SP, is nearest to you and the farthest away from you (@NP) is... you!

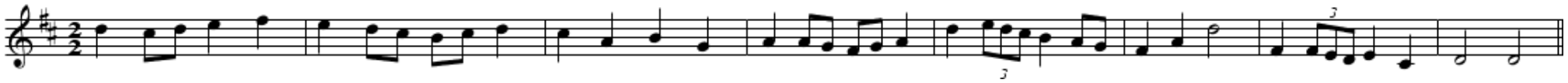
Define:

"Distient" ≔ distant + ancient.

The limping silly scientist's *distient* track
is the part residing beyond the SPP,
so it is unobservable, as said.

Even if you look behind you along the 180° meridian, you won't see it anymore.
It has eroded, got snowed under, whatever.

But, looking from NP along the 0° meridian,
each farther footprint, be it observable or not,
is a *step back* in time.



To you, the silly scientist's halfway point (the SPP),
is farthest & oldest point of his *visible* track, as well
as nearest & least old point of his *distient* track.

The starting point of this *distient* track
is its farthest and oldest point.

His entire *distient* track is unobservable,
although long ago, it started at the
very location where you are right now.

Without the SPP, you could look all the way round
and watch your own occiput how it was long ago.

"Long ago" = light travel time all way round.

AND NOW... SOMETHING NEARLY IDENTICAL!

The universe is a 3-sphere in which *any* viewing direction is towards the ***AP***, which itself goes away from us at c, yielding an unsurpassable barrier,

cf. the **SPP** at your terrestrial ***AP***.

Max. lookback[27] to ***AP*** (*our* frame): $\Delta t_{l,max} = t_{\mathrm{H}}/2$.

Similar to the fact that we can observe only the latest half of the silly scientist's track.

Beyond cosmic ***AP***: ***Distient Universe*** (***DU***).

In ***our*** frame: older than $t_{\mathrm{H}}/2$; each object (unobservable since light already passed us) in opposite direction as seen today.

[27] http://henk-reints.nl/astro/HR-Hubble-Lemaitre-slideshow.pdf

AP leaves us at *speed of light*;

beyond it: adding to c yields c

$\therefore$ entire ***DU*** leaves us at c

$\Rightarrow$ ***DU*** is Lorentz contracted to Sweet Fanny Adams.

$\Rightarrow$ $D_{\mathrm{H}} =$ antipodal distance $\equiv$ all way round.

In our frame, *NO* *cosmic expansion* of *DU*
can have occurred.

YOU  substantiate
any adiabatic cooldown
if there was no expansion.

I claim there wasn't.

Cf. "adiabatic Lorentz compression".

DU still is as **HOT** as how it started at the **BB**.

IF Lorentz contraction affects only *empty* distances,
all true matter (i.e. subatomic particles) contained in ***DU***
must bulge out towards "our side" of ***AP***.

Might that reduce its velocity w.r.t. us to subluminal,
enlarging it since Lorentz contr. no longer to nought?

The thing must be greater than zero.
Maybe 12.5 ly?

In http://henk-reints.nl/astro/HR-Twin-paradox-slides.pdf is explained
that Lorentz contraction does ***NOT physically*** contract a body.

⇒ size of ***DU*** must equal size of decayed ***IniAll*** = **12.5 ly**.

DU actually is the entire cosmos and it

has aged just like the universe on "our side"

of the ***AP***, for both essentially are the very same thing.

$G \propto t_{\mathrm{H}} \Rightarrow$ gravitation should nowadays also prevent its expansion

(*but it's **not** a **BH**; it's a 3-sphere with no internal barycentre*).

DU still is as **HOT** as how it started at the **BB**.

DU must emit thermal radiation, observable in/from all directions.

I cannot conclude anything else than:

***DU is* the CMB source,**

still at primordial temperature of $T_{\mathrm{U},i} = 3$ GK,

(yielding redshifted Planck spectrum as observed)

& having **current proper age of** $t_{\mathrm{H}} \approx 13.77$ Ga

(i.e. it is OK to use today's value of σ_{SB})

& ***proper lookback time*** of $(\zeta^2 - 1)/2\zeta^3 \cdot t_{\mathrm{H}} \approx t_{\mathrm{H}}/2\zeta$

$\approx$ **6 years** + 3 months[28] $(\approx \frac{1}{2}(apparentAge = t_{\mathrm{H}}/\zeta)$, cf. $\Delta\tau_{l,\max} = \frac{1}{2})$

Observed CMB *not* coming from "*youngiverse*"!

Emitted there: ~6 years ago. Travelled: $\frac{1}{2}t_{\mathrm{H}} \approx$ **7** bln. years. Arrives here: right now.

In *its* frame. In *our* frame: time dilation! In *our* frame.

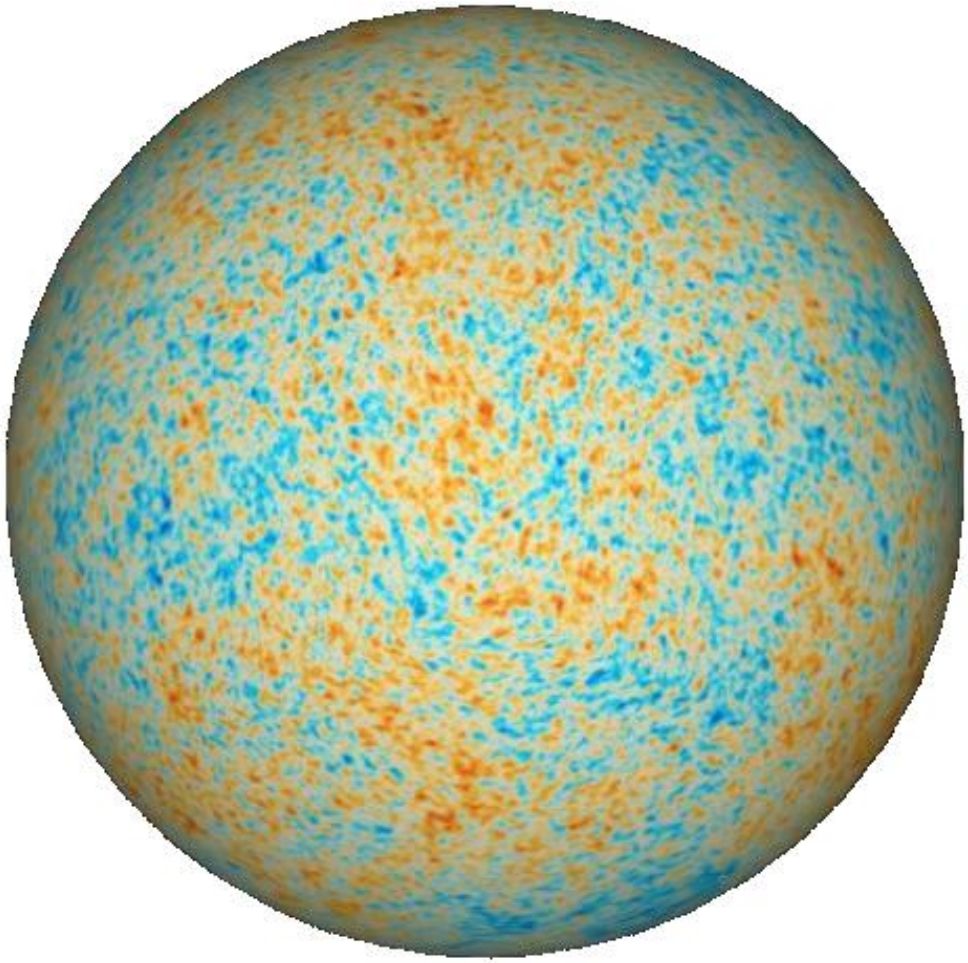
Light itself: ***zero*** *travel time & distance***!**

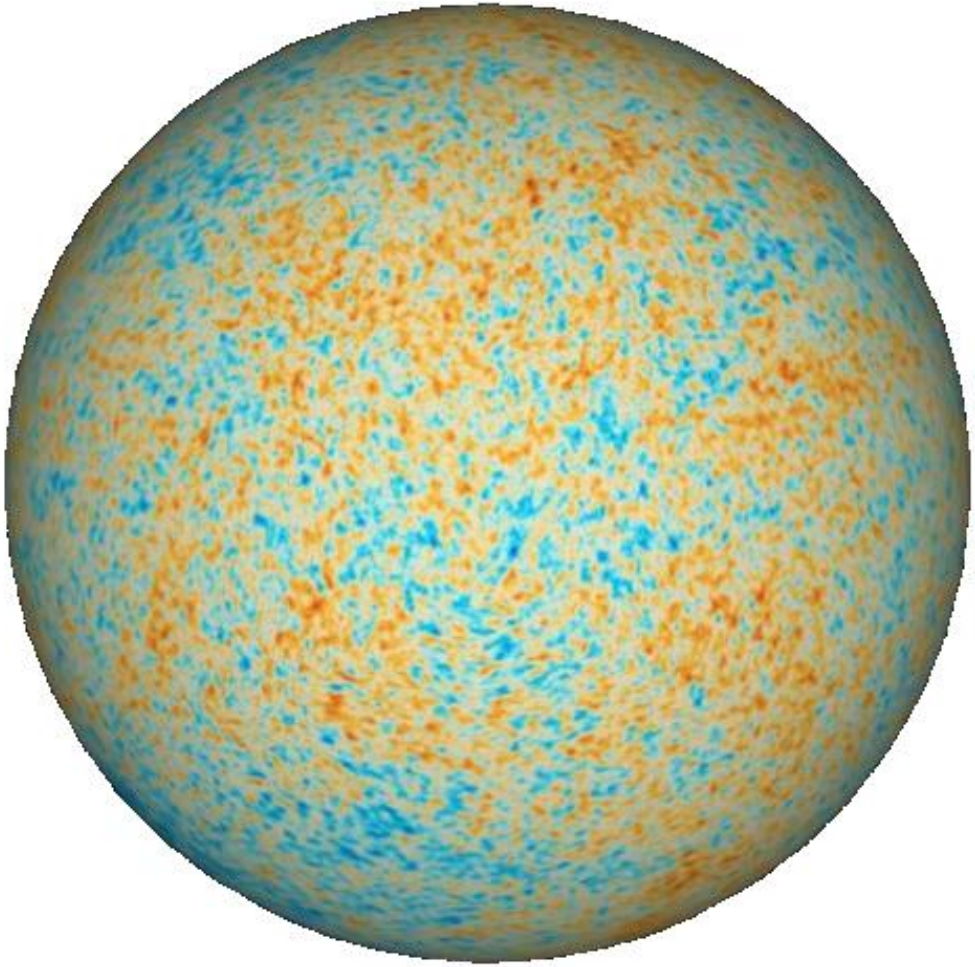
Cogito intelligo, etsi non capio.

I think I understand it, although I don't grasp it.

[28] http://henk-reints.nl/astro/HR-Hubble-Lemaitre-slideshow.pdf

***Distient Universe*, 6.26 yrs ago** (in *its* proper time):





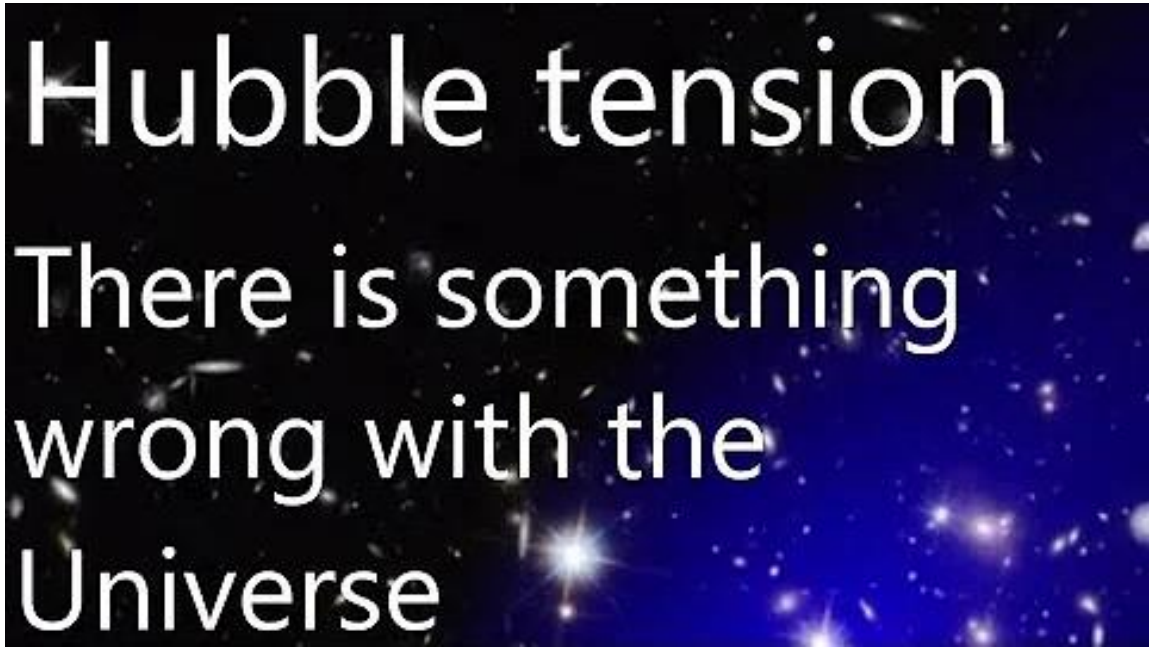
DU ≡ CMB source: small sphere, bulged out from beyond ***AP***
(as observed in *our* frame).
See also: http://henk-reints.nl/astro/CMBRotate/

DU is beyond ***AP***, so in each direction, CMB would correspond to observable objects in just the opposite direction.

To be investigated:

There should exist a correlation between observed mass and CMB flux or temperature in opposite directions.

After all, CMB would come from *DISTIENT* version of that very mass.



https://www.youtube.com/watch?v=jzjKSZQTh_Q

Nope!

There is something wrong with ***your*** theory!

Hubble tension is based on:

$$a(t) = 1/(1+z) = \text{cosmological redshift}$$

NOT **an** ***ascertained truth*****, to be FIRMLY REJECTED!**[29]

DON'T USE SOMETHING NEVER CONFIRMED BY ANY OBSERVATION AS A FUNDAMENTAL PREMISE!

would be: radiation-dominated era: $a(t) \propto t^{1/2}$

matter-dominated era: $a(t) \propto t^{2/3}$

bunkum: dark-energy-dominated era: $a(t) \propto e^{H_0 t}$

$$3H_0^2 = 8\pi G \rho_{\text{full}} = \Lambda = \textbf{NULL \& VOID!}$$

https://en.wikipedia.org/wiki/Friedmann_equations#Density_parameter :

$$\frac{H^2}{H_0^2} = \Omega_{0,R} a^{-4} + \Omega_{0,M} a^{-3} + \Omega_{0,k} a^{-2} + \Omega_\Lambda$$ ($\Omega_{0,x}$ "derived" from CMB).

Ex falso sequitur quod libet.

Hubble tension = difference between ΛCDM and reality.

[29] see also: http://henk-reints.nl/astro/HR-Hubble-Lemaitre-slideshow.pdf

Back to the luminosity of the CMB source:

$$L'_{\mathrm{CMBsrc}} = 4\pi D_{\mathrm{H}}^2 \cdot 4\sigma_{\mathrm{SB}} T_{\mathrm{CMB}}^4$$

$=$ apparent surface of sphere $(r = D_{\mathrm{H}})$

$\times$ theoretically observed 4π CMB flux;

CMB seemingly comes from Euclidean sphere around us.

Likewise: *we* are such a sphere around CMB source, irradiated with a flux of:

$$j_{\mathrm{CMB}} = \frac{L'_{\mathrm{CMBsrc}}}{4\pi D_{\mathrm{H}}^2} = 4\sigma_{\mathrm{SB}} T_{\mathrm{CMB}}^4 \approx 12.516\ \mu\mathrm{W/m}^2$$

energy density: $\rho_{E,\mathrm{CMB}} = \frac{j_{\mathrm{CMB}}}{c} \approx 4.1748 \times 10^{-14}\ \mathrm{J/m}^3$

Emitted energy flux: $j^*_{\mathrm{CMBsrc}} = \sigma_{\mathrm{SB}} T^4_{\mathrm{CMBsrc}}$

emitted energy density: $\rho_{E,\mathrm{em}} = \frac{j^*_{\mathrm{CMBsrc}}}{c} \approx 1.53 \times 10^{22}\ \mathrm{J/m^3}$

must apply:

- dilution due to cosmic expansion: $\times 1/\zeta^3_{\mathrm{CMB}}$;
- from all directions: $\times \frac{4\pi r^2}{\pi r^2} = \times 4$;
- relativistic dimming: $\times 1/\zeta_{\mathrm{CMB}}$;

observed energy density:

$$\rho_{E,\mathrm{obs}} = \frac{\rho_{E,\mathrm{em}}}{\zeta^3_{\mathrm{CMB}}} \cdot \frac{4}{\zeta_{\mathrm{CMB}}} = \frac{4\sigma_{\mathrm{SB}} T^4_{\mathrm{CMBsrc}}}{c\zeta^4_{\mathrm{CMB}}} = \frac{4\sigma_{\mathrm{SB}} T^4_{\mathrm{CMB}}}{c} = \frac{j_{\mathrm{CMB}}}{c}$$

$=$ same as last page.

Rough estimate of CMB lifetime:

proper frame: $\frac{1}{2}E_{\mathrm{U},i}/L^{*}_{\mathrm{CMBsrc}} \approx 35.4\ \mathrm{yr} \approx \mathbf{2.84} \cdot 12.5\ \mathrm{yr},$

our frame: $\frac{1}{2}E_{\mathrm{U},i}/L'_{\mathrm{CMBsrc}} \approx 39 \times 10^{9}\ \mathrm{yr} \approx \mathbf{2.84} \cdot t_{\mathrm{H}_0},$

so it'll keep on shining for a while.

$T_{\mathrm{U},i}$	derived from neutron decay
T_{CMB}	depends on peak CMB *frequency*, ***not*** on ***flux***
A'_{CMBsrc}	depends on $\zeta_{\mathrm{CMB}} = T_{\mathrm{U},i}/T_{\mathrm{CMB}}$
j^{*}_{CMBsrc}	depends on $T_{\mathrm{U},i}$
j_{CMB}	has been measured
found:	$L'_{\mathrm{CMBsrc}} = A'_{\mathrm{CMBsrc}} \cdot j^{*}_{\mathrm{CMBsrc}} = 4\pi D_{\mathrm{H}}^{2} \cdot j_{\mathrm{CMB}}$

Theoretically expected flux equals observed flux.

Ergo conclusio:[30]

CMB hardly attenuated over entire D_{H} .

[30] A witticism by Dutch comedian Kees van Kooten.

CMB photons that are not absorbed by anything will ultimately go all the way round.

Although largely redshifted, practically all energy coming from CMB source's front door eventually returns home via back door.

Doors are different objects;
cannot have greater mutual distance than D_{H};[31]
travel time in back door's frame: $t_{\mathrm{H}_{emit}} = \frac{1}{2} t_{\mathrm{H}_{recv}}$.

Plausibly, CMB source will hardly cool down, thus extending CMB life time to near infinity.

[31] http://henk-reints.nl/astro/HR-Hubble-Lemaitre-slideshow.pdf

Andromeda galaxy:

estimated no. of stars: $N_{☆,\mathrm{A}} \approx 10^{12}$ **HR:** $\frac{3}{4} \times \mathbf{10^{12}}$

absolute magnitude: $\mathcal{M}_{\mathrm{A}} = -21.5$ ⌜ $N_{☆,\mathrm{MW}} \approx 3 \times 10^{11}$

luminosity: $L_{\mathrm{A}} = 100^{(-\mathcal{M}_{\mathrm{A}}/5)} L_0$ ⌞ & $M_{\mathrm{A}} \approx 1.3 M_{\mathrm{MW}}$

$\approx 1.2 \times 10^{37}$ W

estimated mean stellar luminosity: $\overline{L_{☆}} = L_{\mathrm{A}} / N_{☆,\mathrm{A,HR}}$

$\approx 1.6 \times 10^{25}$ W $\approx \mathbf{0.04} L_{\odot}$

est. mean stellar mass: $\overline{M_{☆}} \approx (\sqrt[3]{0.04} \approx \frac{1}{3}) M_{\odot}$

$M_{\mathrm{IGM}} \approx \frac{1}{2} M_{\mathrm{U}}$: $\frac{1}{2} M_{\mathrm{U}} \approx 2.2 \times 10^{22} \cdot M_{\odot}$

#stars in universe: $N_{☆,\mathrm{U}} \approx \left(\frac{2}{\frac{1}{3}} = \mathbf{6}\right) \times \mathbf{10^{22}} \approx 0.1$ mol

based on SDF: $N_{☆,\mathrm{U}} \approx N_{\text{🌀},\mathrm{U}} \cdot N_{☆,\mathrm{MW}} / 10 \approx \mathbf{6.6 \times 10^{22}}$

rel. dimming: $\bar{\zeta} \approx 1.7347$ (num. approx.)

$L'_{☆,\mathrm{U}} = N_{☆,\mathrm{U}} \cdot \overline{L_{☆}} / \bar{\zeta}$ $\approx 5.83 \times 10^{47}$ W ($N_{☆,\mathrm{U}} = 6.6 \times 10^{22}$)

observed portion: $\frac{\pi}{4\pi} = 0.25 \rightarrow L''_{☆,\mathrm{U}} \approx \mathbf{1.46 \times 10^{47}}$ **W**

$\frac{L'_{\mathrm{CMBsrc}}}{L''_{☆,\mathrm{U}}}$ $\frac{2.67 \times 10^{48}}{1.46 \times 10^{47}} \approx 18.3$

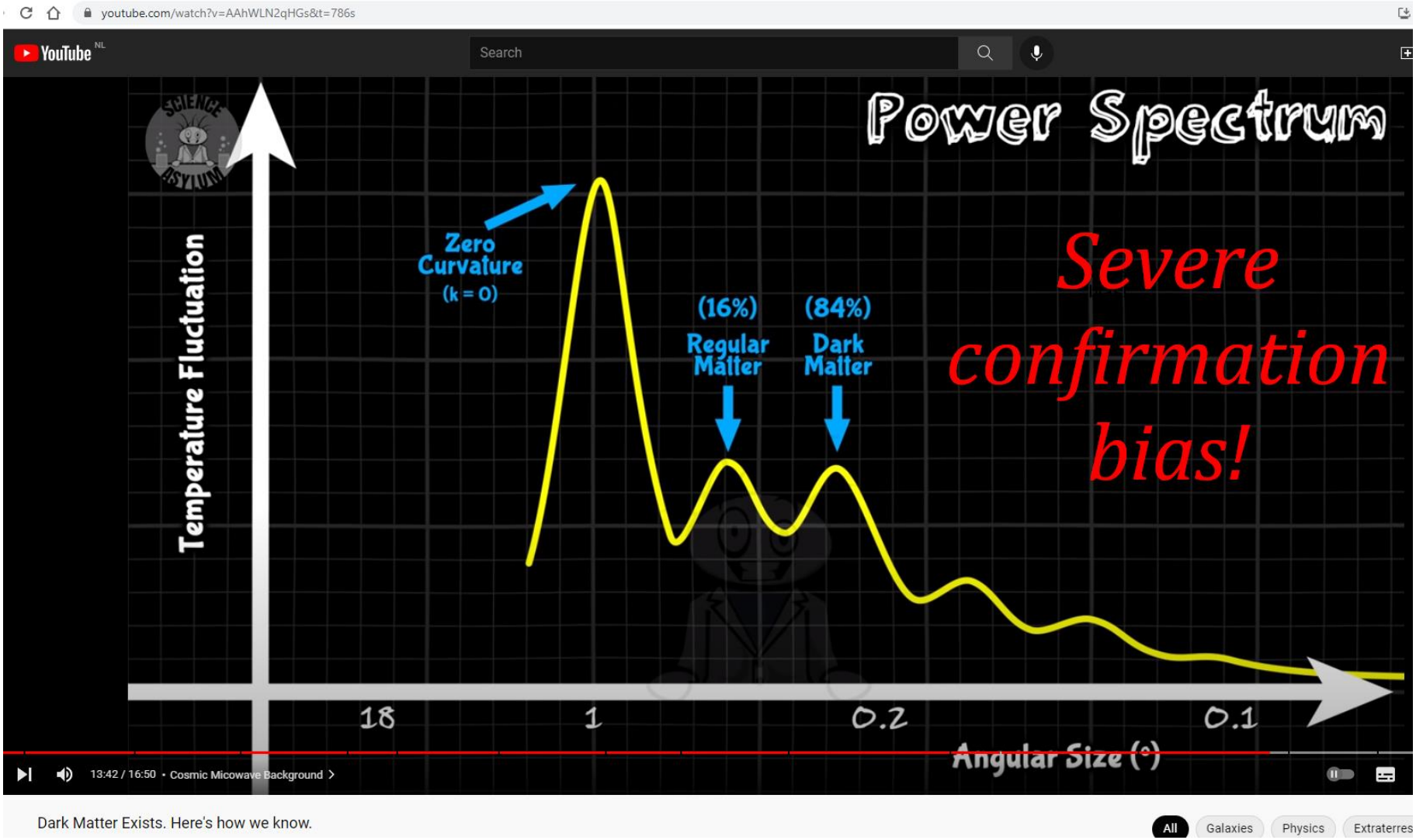
S. Driver et al.[32]: $CMB/EBL \approx 20$

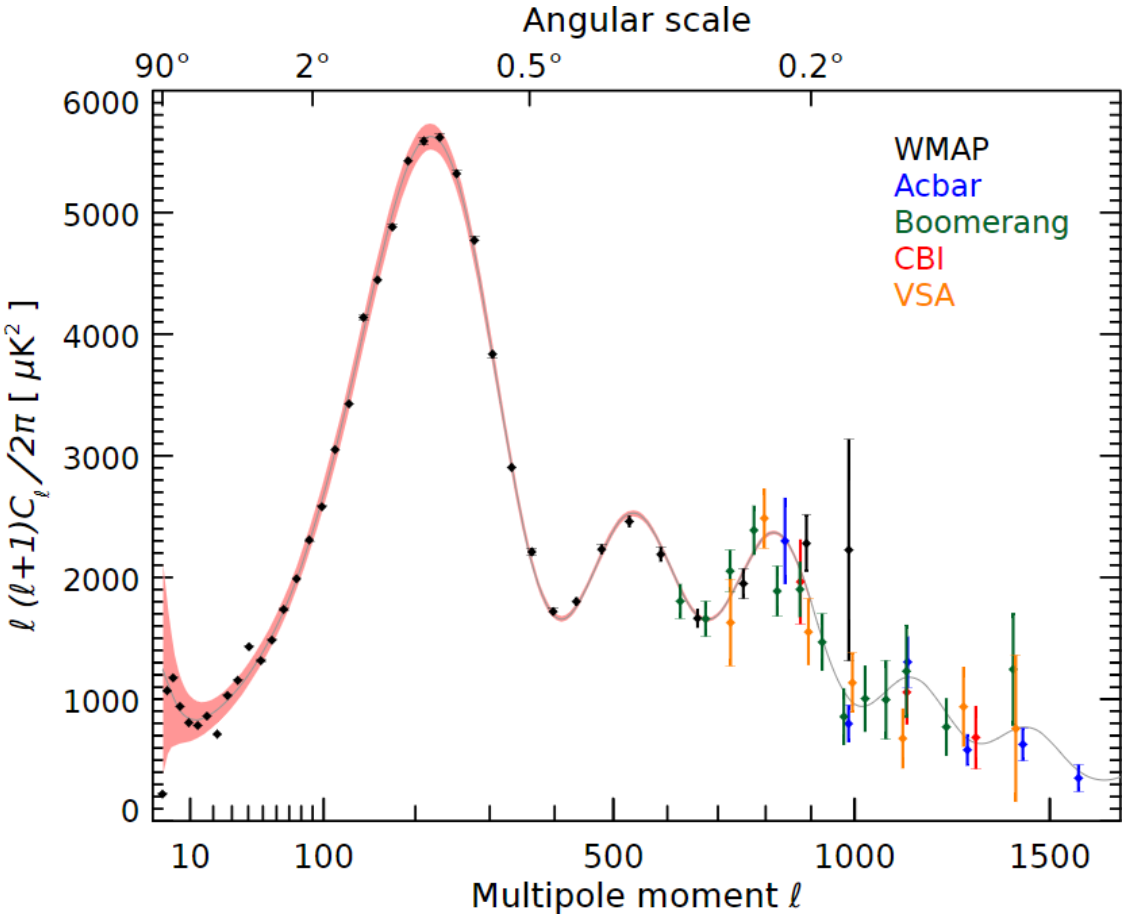
[32] Simon P. Driver *et al.* 2016 *ApJ* **827** 108, https://dx.doi.org/10.3847/0004-637X/827/2/108

YouTube: "The Science Asylum":

"Dark Matter Exists. Here's how we know." **[HR: nope!]**

(https://www.youtube.com/watch?v=AAhWLN2qHGs&t=786s)





Graph by NASA/WMAP Science Team - lambda.gsfc.nasa.gov PowerSpectrumExt.pdf in a collection of WMAP Data Product Images. Public Domain.

https://sci.esa.int/web/planck/-/51555-planck-power-spectrum-of-temperature-fluctuations-in-the-cosmic-microwave-background

shows a similar graph and says drawn curve is a *best fit*.

The value $\ell(\ell+1)C_\ell/2\pi$ can be made to fit ANY dataset by manipulating C_ℓ values.

CURVE FITTING proves nothing

& never renders a fundamental explanation.

The universe is a linearly expanding glome (from BB until *NOW*)

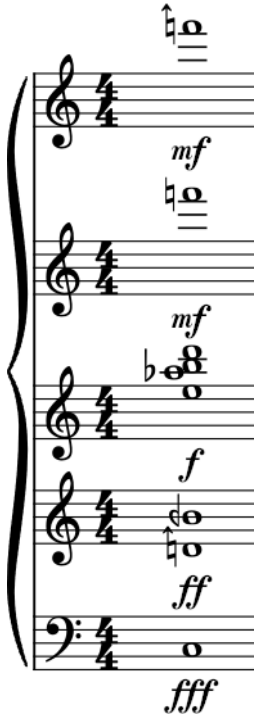
with ~~zero~~ no dark matter and ~~zero~~ no dark energy.

CMB power spectrum = quadratic temperature variations.

Temperature fluctuations = pressure fluctuations = sound.

(Multipole moment ≙ angular size ≙ wavelength).

peak	ℓ_i	ratio	semitones	~note & octave	"power" [μK^2]
9	2445	10.86	41.286	+f'''	390
8	2385	10.59	40.856	f'''	342
7	1995	8.86	37.764	d'''	2811
6	1725	7.66	35.246	b''	3977
5	1425	6.33	31.938	a♭''	9677
4	1125	4.99	27.845	e''	11063
3	**825**	**3.66**	**22.474**	**–b'**	**30219**
2	**525**	**2.33**	**14.649**	**+d'**	**23140**
1	**225**	**1.00**	**0.000**	**≔ c**	**69434**
TTHILBIN @https://irsa.ipac.caltech.edu/data/Planck/release_2/ancillary-data/previews/ps_index.html					



Ctrl+click or Right-click & Open in new tab: http://henk-reints.nl/astro/CMB-power-spectrum.html

Que diable venez vous me chanter là, monsieur le curé?
Vous avez la voix fausse!

What the devil are you singing to me, dear priest? You are out of tune!
Last words of Jean-Philippe Rameau (1683-1764).

CMB source: ions = protons: $\gamma = \frac{5}{3}$ (adiabatic index), $Z = 1$ (charge/e), $m_i = m_\mathrm{p}$ (mass)

Speed of sound in plasma: $c_s = \sqrt{\frac{\gamma Z k_\mathrm{B} T_\mathrm{e}}{m_i}} = \sqrt{\frac{5 k_\mathrm{B} T_{\mathrm{U},i}}{3 m_\mathrm{p}}} \approx 6.4 \times 10^6$ m/s

note: $c_s \propto \sqrt{\zeta_\mathrm{CMB}}$

angular scale: $\varphi_i = \frac{\pi}{\ell_i}$ (between "meridians");

wavlen in CMBsrc's frame: $\lambda_s \approx \varphi_i \cdot r_\mathrm{CMBsrc}$ (∠ from here = ∠ from A.P.)

note: $\lambda_s \approx\propto \zeta_\mathrm{CMB}^{-1}$ $(r_\mathrm{CMBsrc} \approx \frac{D_\mathrm{H}}{\zeta_\mathrm{CMB}})$

frequency: $\nu_s = \frac{c_s}{\lambda_s} = \frac{c_s}{\varphi_i \cdot r_\mathrm{CMBsrc}} = \frac{\ell_i c_s}{\pi \cdot r_\mathrm{CMBsrc}} \propto \zeta_\mathrm{CMB}^{3/2}$

period in proper frame: $T = \frac{1}{\nu_s} = \frac{\pi \cdot r_\mathrm{CMBsrc}}{c_s} \cdot \frac{1}{\ell_i} \approx \frac{1840}{\ell_i}$ years;

as observed in our frame: $T' = T \cdot \zeta_\mathrm{CMB} \approx \frac{2 \times 10^{12}}{\ell_i}$ years.

First peak ($\ell = 225$): $T \left(\propto \zeta_\mathrm{CMB}^{-3/2}\right) \approx 8$ years;

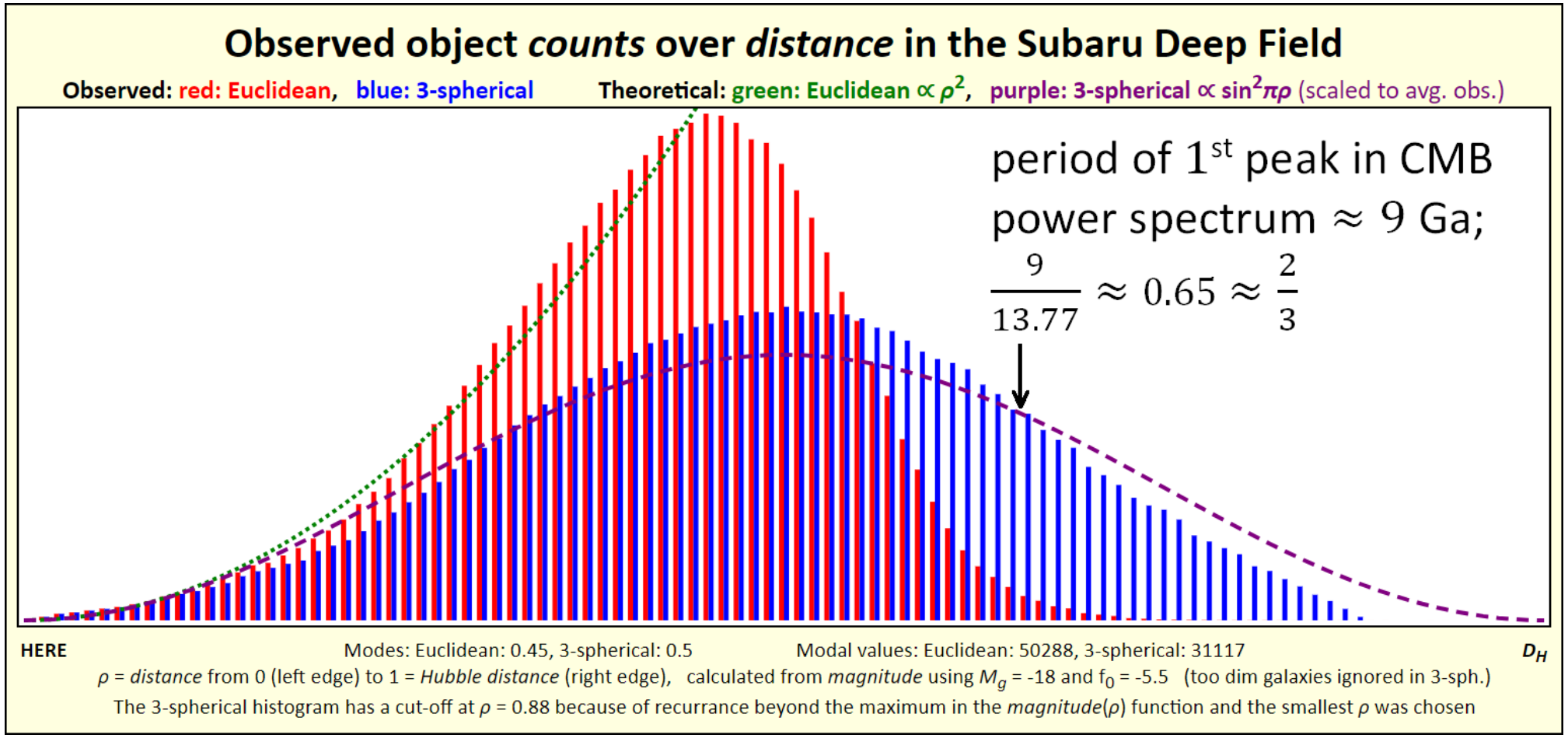
in our frame: T' $\left(\propto \zeta_\mathrm{CMB}^{-1/2}\right) \approx 9 \times 10^9$ years.

(Higher peaks ($\ell > 225$) oscillate faster).

Do you remember this value of 9 billion years?

No?

Presumed ***IniAll*** genesis as incoming stream of matter: start below average, then surplus, dying out with less:



BIG BOOOOOOM (≈ 12.5 yrs) | **confirms:** $\zeta_{CMB} \approx 1.1 \times 10^9$ & $t_H \approx 13.77$ **Ga** (remember μ_0?)

Five completely independent (sets of) observations/measurements

(SDF, QSOs, supernovae, CMB & μ_0)

yield consistent results.

The 3-spherical universe originates from relatively cold (≲ 1 GK) neutrons

(wherever they came from)

that had fully decayed at $t_H \approx 12.5$ years.

Based on shape of SDF histogram, inflow of neutrons presumably lasted 12.5 years and not 01:45 or so.

See also: http://henk-reints.nl/astro/HR-Fundamental-units-of-time-and-length.pdf

BIG BANG lasted 12.5 years!

NO BIG BANG SINGULARITY!

No, no, no, my dear Stephen!

A ***singularity*** is a point where
something is ***mathematically impossible***.
*Then **how** can one say it is a **physical reality?***

Fundamental: ***NO WAY*** to ***OBSERVE ANYTHING***
with ***proper*** *lookback time* $> t_{\mathrm{H}}/3\sqrt{3} \approx 0.19245 \cdot t_{\mathrm{H}}$

CMB proper lookback $\approx$ 6.26 years!

Maybe we can use

$\Delta t_{\mathrm{BB}} \approx 12.5$ years $\approx 3.95 \times 10^{8}$ s

as universal (*multi*versal?) fundamental

immutable unit of time?

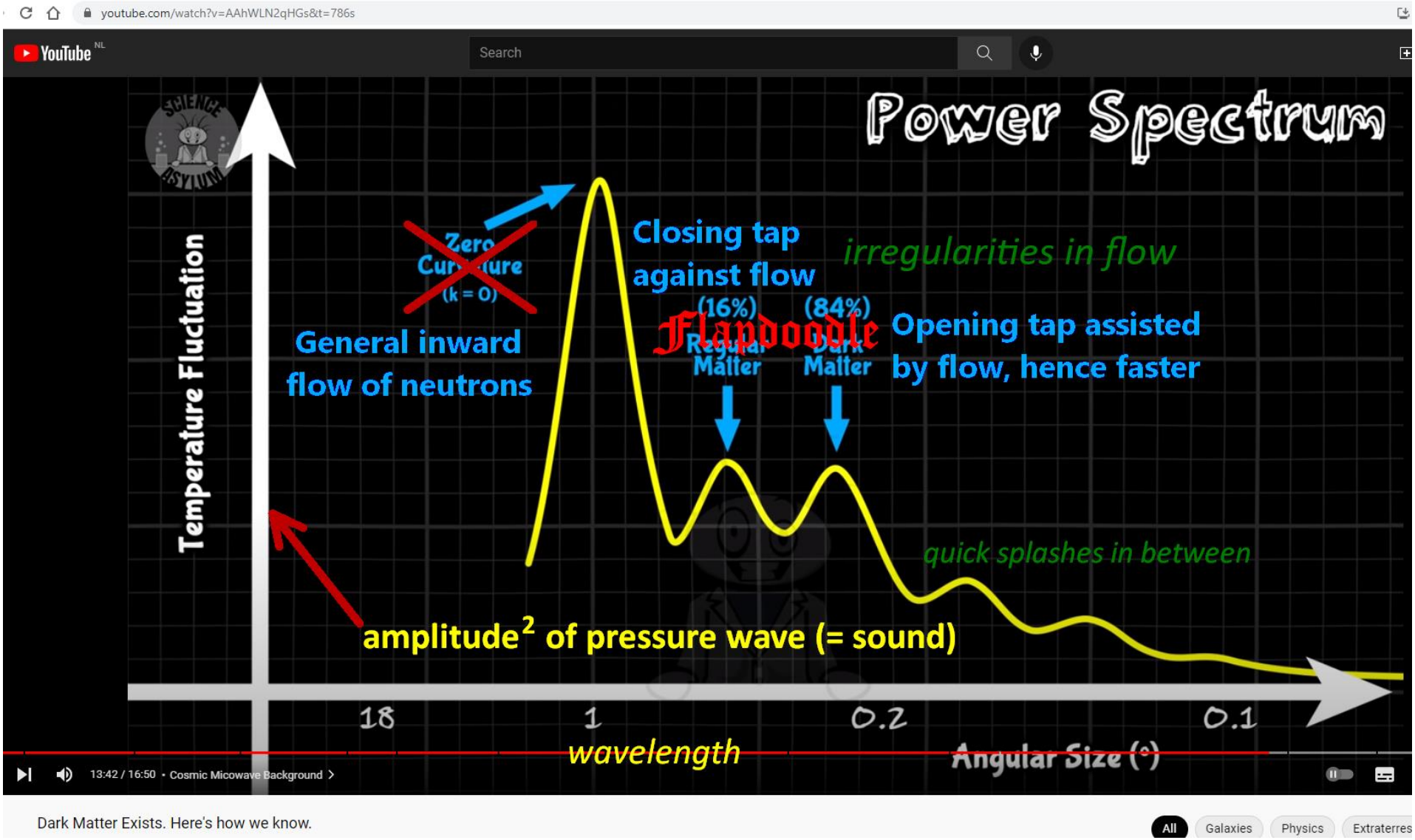
Per original neutron:

$\Delta t_{\mathrm{BB}/n} \approx \Delta t_{\mathrm{BB}} / N_{\mathrm{U}} \approx 7.53 \times 10^{-72}$ s.

Corresponding unit of length:

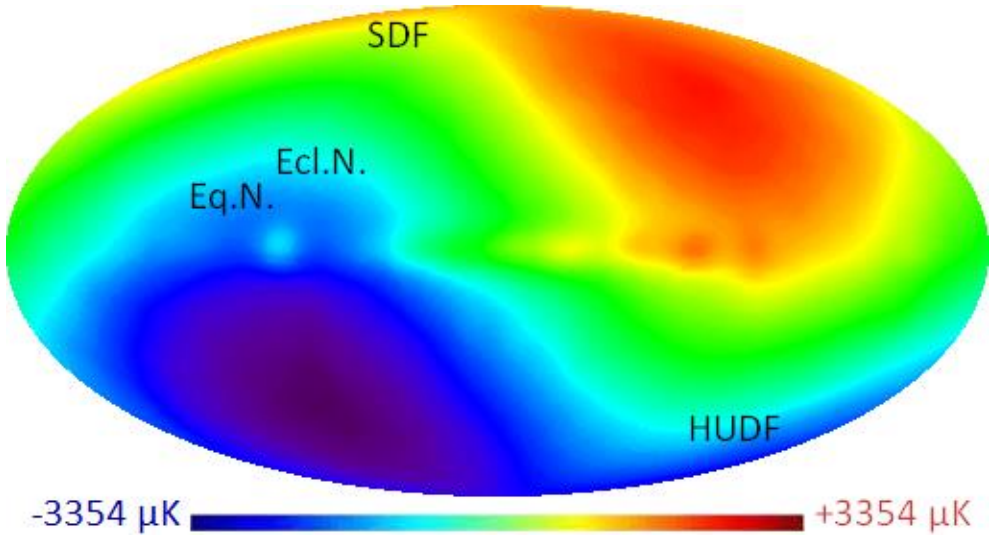
$\Delta l_{\mathrm{BB}/n} = c \Delta t_{\mathrm{BB}/n} \approx 2.26 \times 10^{-63}$ m.

But they cannot accurately be determined.



Dark matter doesn't exist. It's a concoction, based on the utterly stupid blunder of Keplerian decline.
See http://henk-reints.nl/astro/HR-Dark-matter-slideshow.pdf

CMB ~~anomaly~~ asymmetry ($\pm 1.23‰$):



We're moving w.r.t. CMB

(at ~370 km/s). **Or are we?**

Does it not come to us at the very *speed of light* from *all* directions?

Moving w.r.t. CMB **source!**

But moving w.r.t. AP? *Hmm...*

"Bathroom colors": colder = more redshift, hotter = less redshift!

(I hope my annotations in the image are more or less correct).

Maybe a *true* temperature difference?

CMB source is small (12.5 ly in *its* frame). *Exactly* AP-centered?

Asymmetry in observed cosmos (i.e. younger half of t_H) as well?

Standing wave within the thing?

SDF is near gal. north. Histogram "phase shifted" in other dir.?

Actually observed in opposite directions:

different CMB peak frequencies

(i.e. where it has its maximum intensity).

Can be: true temperature difference in CMB source

(*a rather small entity around the AP!*)

or: redshift difference ⇒ velocity of the thing.

What ~~on earth~~ in the cosmos

makes you decide it is a redshift difference?

Don't come up with (implicit) assumptions!

Only ascertained truths[33] are acceptable!

[33] See http://henk-reints.nl/HR-About-me.pdf

WOULD the CMB asymmetry be a simple pressure/temperature dipole oscillation:

Diameter: $2 \times 12.5 = 25$ ly

back & forth: 50 ly

speed of sound (as found above): $c_s \approx 6.4 \times 10^6$ m/s

osc. period in *its* frame: $(50 \text{ ly})/c_s \approx 2342$ years

in *our* frame ($\times \zeta_{\text{CMB}}$): 2576 Ga

We won't see it change very soon.

Gravitational collapse

volume of cosmos: $$V_{\mathrm{U}} = \frac{2D_{\mathrm{H}}^3}{\pi} = \frac{2c^3 t_{\mathrm{H}}^3}{\pi}$$

mean cosmic density: $$\rho_{\mathrm{U}} = \frac{M_{\mathrm{U}}}{V_{\mathrm{U}}} = \frac{\pi M_{\mathrm{U}}}{2c^3 t_{\mathrm{H}}^3}$$

Mach8: $$G = \frac{c^3 t_{\mathrm{H}}}{2M_{\mathrm{U}}}$$

Jeans mass at mean cosmic density:

$$M_{\mathrm{J}} = \sqrt{\left(\frac{5k_{\mathrm{B}}T}{Gm}\right)^3 \frac{3}{4\pi\rho}} = \frac{10\sqrt{15}M_{\mathrm{U}}}{\pi} \cdot \sqrt{\left(\frac{k_{\mathrm{B}}T}{mc^2}\right)^3}$$

Adiabatic expansion ($T \cdot V^{2/3} = constant$):

$$D_{\mathrm{H}}(t_{\mathrm{H}}) = D_{\mathrm{H,CMBsrc}} \cdot \sqrt{T_{\mathrm{CMBsrc}}/T(t_{\mathrm{H}})}$$

or: $$t_{\mathrm{H}}^2 = t_{\mathrm{CMBsrc}}^2 \cdot T_{\mathrm{CMBsrc}}/T(t_{\mathrm{H}})$$

hence: $$T(t_{\mathrm{H}}) = \Theta/t_{\mathrm{H}}^2$$

where: $$\Theta = t_{\mathrm{CMBsrc}}^2 \cdot T_{\mathrm{CMBsrc}}$$

$$\approx (12.5 \text{ years})^2 \cdot (3 \times 10^9 \text{ K}) \approx 4.67 \times 10^{26} \text{ s}^2\text{K}$$

Jeans mass at mean cosmic density: $$M_{\mathrm{J}} = \frac{10\sqrt{15}M_{\mathrm{U}}}{\pi t_{\mathrm{H}}^3} \cdot \sqrt{\left(\frac{k_{\mathrm{B}}\Theta}{mc^2}\right)^3}$$

collapse of M_{J} possible at/after: $$t_{\mathrm{H}} = \sqrt[3]{\frac{10\sqrt{15}M_{\mathrm{U}}}{\pi M_{\mathrm{J}}}} \cdot \sqrt{\frac{k_{\mathrm{B}}\Theta}{mc^2}}$$

Free-fall time: $$\Delta t_{\mathrm{ff}} = \sqrt{\frac{3\pi}{32G\rho}} = t_{\mathrm{H}}\sqrt{3/8}$$

Collapse of cloud of atomic hydrogen ($m = 1.008$ amu) slightly above mean cosmic density (of that moment) possible after:

Object	$mass/M_\odot$	t_H/year	Δt_{ff}/year	Δt_{life}/year
TON 618	66×10^9	4 200	2 600	
M87*	6.5×10^9	9 100	5 600	
Sgr A*	4.15×10^6	105 000	64 000	
supergiant	16	6.7×10^6	4.1×10^6	10×10^6
sun-like	1	17×10^6	10×10^6	10×10^9
Hawking's primordial BH[34] ROFLOL	$< 10^{15}$ gram $\rho \approx 7.3 \times 10^{55}$ kg/m^3 $\approx 5 \times 10^{37} \rho_{C,n}$	21×10^{12} $\approx 1525 \cdot t_H$	13×10^{12} $\approx 945 \cdot t_H$	evap.: 2.7×10^{12} $\approx 195 \cdot t_H$

Plausible:

- within ¼ million years *all* SMBH's were a fact (Sgr A* is tiny);
- first stardust ("metals") of 1st generation heavy stars already existed at birth of first sun-like stars.

[34] S.W. Hawking: "Particle Creation by Black Holes", Commun. math. Phys. 43, 199—220 (1975)
https://projecteuclid.org/journals/communications-in-mathematical-physics/volume-43/issue-3/Particle-creation-by-black-holes/cmp/1103899181.full

Standard BB ~~theory~~ fabrication:

- not a single premise can be considered an ascertained truth;
- **severely violates very fundamental principles** (like speed limit of light);
- many inconsistent presumptions not derived from any truths, e.g. cosmic inflation, cosmological redshift, dark brainchildren;
- incomprehensible to well thinking people, let alone laymen;
- non unum scrotum pulsat; *d'r klopt geen ene zak van*; *there knocks no bag from*[35].

My version:

- inflow of tangible matter = assumption☹, rest = well substantiated;
- as good as possible derived from ascertained truths, not breaking any fundamental law of physics;
- consistent with observed phenomena, such as SDF distance histogram and CMB power spectrum (which seem correlated!);
- can (hopefully) be understood by a child.

[35] Latina ollularia / Dutch / Dunglish for: *it's totally wrong, balderdash, poppycock.*

👍 Deduced from ascertained truths:

- ☑ **universe = 3-sphere with $D_{AP} = D_H = D_S$;**
- ☑ **strictly linear expansion, right from BB up to *NOW*;**
- ☑ **Mach8: $G \propto t_H$;**

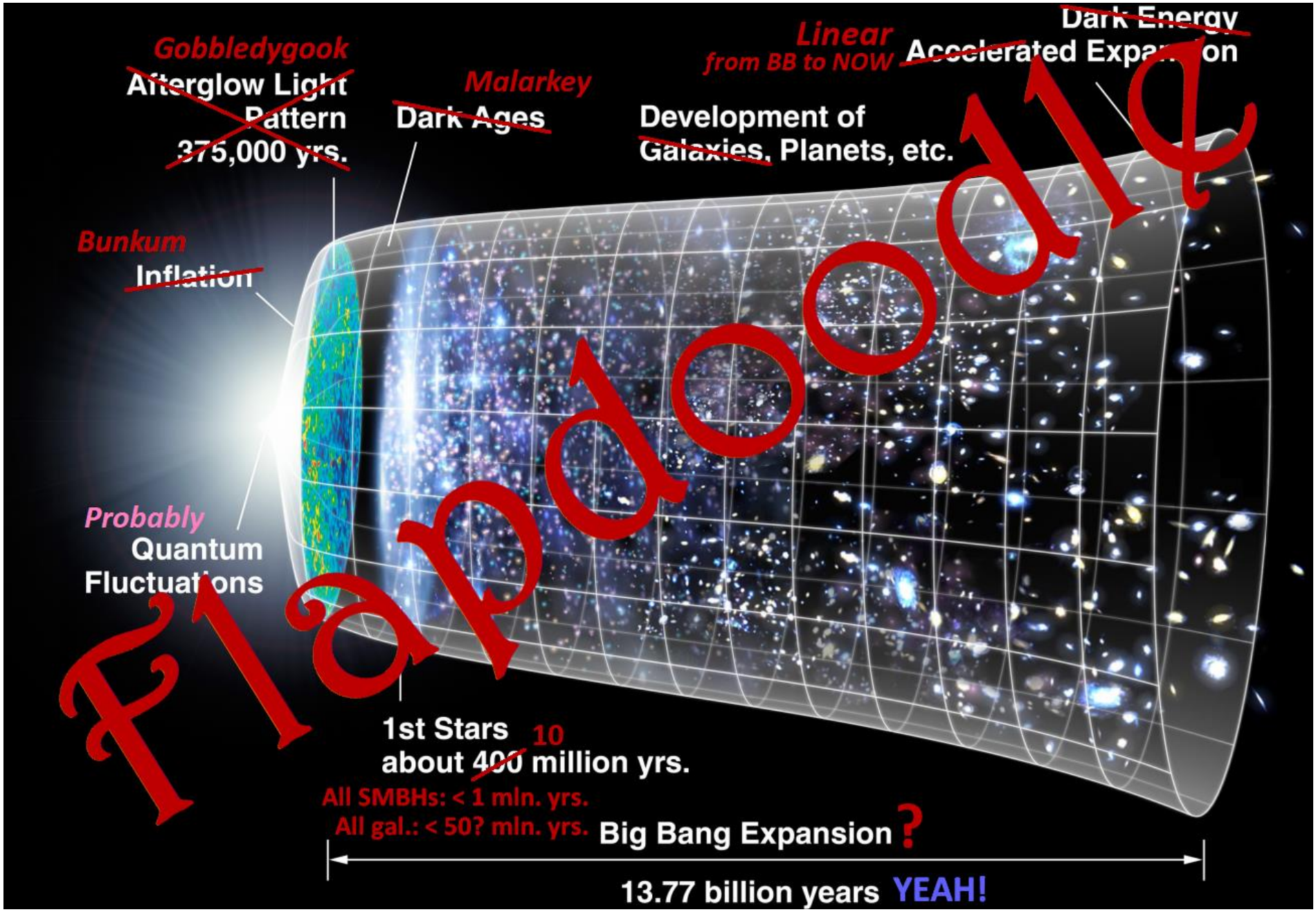
🤞 plausible:

- ☆ Planck's constant not truly constant: $h \propto t_H$;
- 🤔 fundamental units of length & time: $\propto t_H$;

☸ Cosmic Microwave Background:

- 🤞 redshift $= 1.1 \times 10^9$ (most probably);
- 🤞 not coming from recombination, nor from BB;
- 🤞 CMB source = "distient" universe at 3 GK & 13.77 Ga;
- 🤞 lgt.trav. ~6.9 Ga, proper lookback time = 6.26 years[36].

[36] See http://henk-reints.nl/astro/HR-Hubble-Lemaitre-slideshow.pdf



age [years]	**description**	
0	formation of ***IniAll*** $\stackrel{?}{=}$ inflow of "cold" neutrons of $\mathcal{O}(1\ \mathrm{GK})$?	BB
12.5	***IniAll* fully decayed; inflow stopped; primordial $T = 3$ GK $\rightarrow \zeta = 1.1 \times 10^9$, $\rho \approx$ solid hydrogen**	
4 000	TON 618 begins to form (gravitational collapse)	FUNDAMENTALLY UNOBSERVABLE
7 000	TON 618 exist	
9 000	M87* begins to form	
12 500	$T = 3000$ K (recombination; irrelevant)	
15 000	M87* is fully operational	
105 000	Sgr A* begins to form (small SMBH)	
170 000	Sgr A* is a fact	
250 000	***all*** SMBHs exist	
~1 mln.	less heavy clouds are fragmenting & turning into globular clusters	
~6 mln.	first giant stars ($16 M_\odot$) begin to form	
~11 mln.	first giants performing nucleosynthesis, shining brightly	
~17 mln.	first sun-like stars begin to form	
~20 mln.	first supernovae, yielding heavier elements	
~27 mln.	sun-like stars performing nucleosynthesis, shining brightly	
? 100 mln.	all galaxies exist, containing all types of (young) stars	
7 ***b**ln.*	maximum lookback in *OUR* frame	
10 ***b**ln.*	death of first sun-like stars, birth of first white dwarfs	
> 11 ***b**ln.*	minimal observed *proper* age of distant objects	**All we can see.**
14 ***b**ln.*	***NOW***	

See also: http://henk-reints.nl/astro/HR-Hubble-Lemaitre-slideshow.pdf

Since exact antipodal point
of any mass recedes from it
at the *speed of light*,
this AP must be massless,
hence mass cannot be a continuum,
which agrees with matter
consisting of particles.

Severe misconceptions:

- Flatness problem;

  the universe is a glome. Full stop.

- Accelerated expansion;

  doesn't it contradict $D_H = ct_H$?

  Facts (SDF, SDSS:DR16Q) show that it has always been as linear as can be, right from nought at BB until now.

Figments of imagination, derived from *phenome-none*:

- Superluminality.
- Horizon problem.
- Superluminality & horizon problem.
- Horizon problem & superluminality.
- Diameter of 93 billion light years. ROFLOL!
- Light that did not yet have time to reach us = bollocks!
- Unobservable part of the universe (≠ part of universe).
- Disconnected parts of the ~~brai~~ universe.
- Inflationary universe = gobbledygook, bunkum;
  both problems to be solved (horizon & flatness) do not exist at all and their "solution" was deduced from **completely nothing**!
- Standard BB ~~theory~~ fiction = fairy tale, flapdoodle.
- Dark energy (accelerated expansion is a misconception, they discovered the 3-sphericality without realising it).

And even I can speculate about the unknowable...

Multiverse of concentric glomes with continuous
or oscillating genesis at its very hyper centre?

Cf. aforementioned assumed quantised cosmic expansion:
hyper radially propagating wave of expanding universes?

Alternating as universe, antiverse, etc.?

(Oscillating) dipole ⇒ multiverse pairs in counterphase?

n-spherical polymultiverse?

Recursion to even higher levels ad infinitum?

HyperSuperPolyMultiHenkyverse!

Continued speculation:

Consider just one of the three spatial dimensions of the cosmos:

- equivalent to an expanding circle, lying on a table;
- radius = universe's hyper radius (4^{th} dimension).

⇗ Inward energy flow from above and below (5^{th} dimension):

⇑ ▸ N_U (anti)neutron pairs produced at hyper centre;

⇑ ▸ expanding *uni*verse on table top, *anti*verse at underside.

⇑ Pulsating energy flow, next time in counterphase:

⇑ ▸ *anti*verse at upside, *uni*verse at undersurface.

⇖ Repetitio ad infinitum.

One fundamental TIME for entire multiverse!

N-spherical plethora of tables, hyper tables, etc.
in endless recursion.

Background image from: https://alexanderteachingstudio.com/76-consistently-matters-occasionally-doesnt/

Continued speculation:

What existed before the big bang?

Our outer neighbour, *its* outer neighbour, etc.

What existed/occurred thereafter?

The above plus ***our cosmos***;

births of several inner neighbours.

What will exist in the future?

Hypotheſes non fingo…

https://www.youtube.com/watch?v=hqwIifgs7KU (Ctrl+click!)

[end of speculation]

(2023-11-16)

On Earth, a circle of latitude is the edge of a 2-sphere cap.

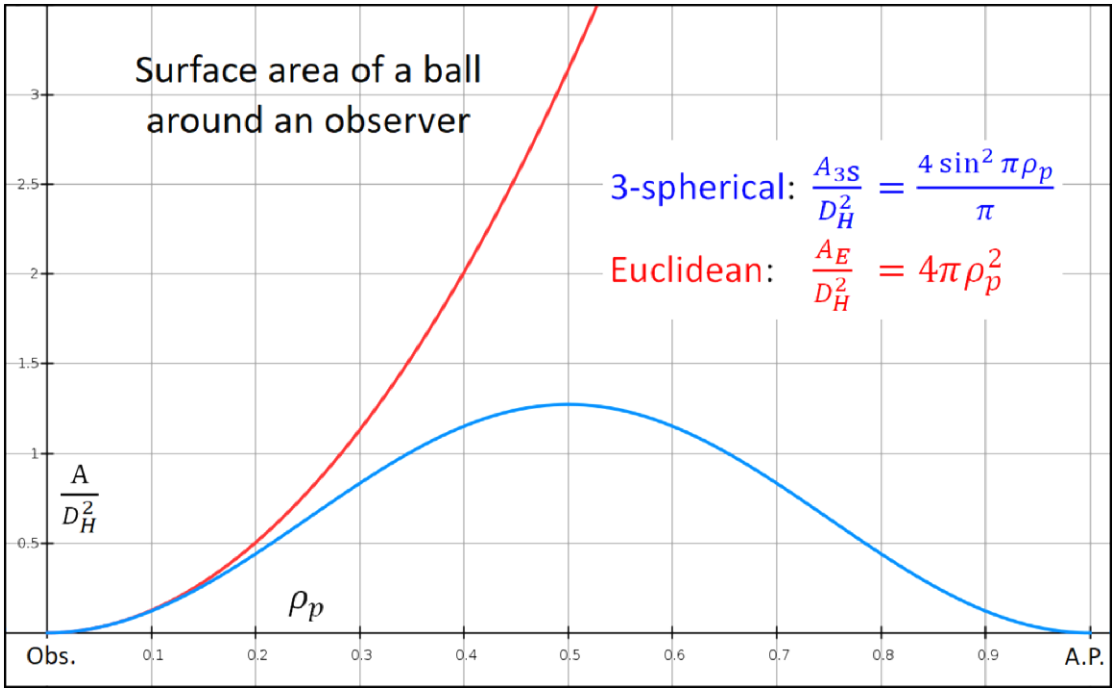
In the cosmos, a 2-sphere around us
is the surface of a 3-sphere cap, a "ball of latitude".

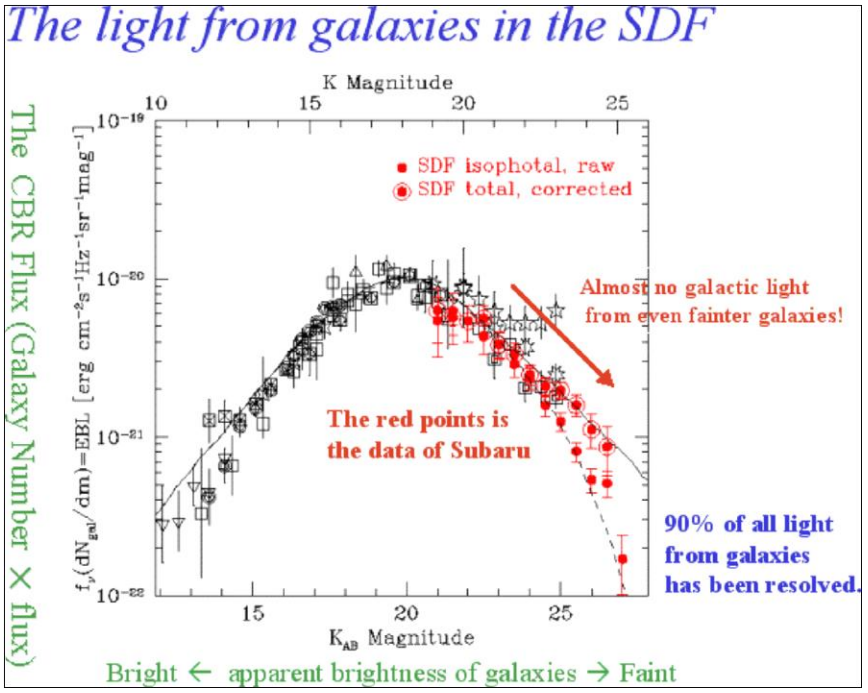
What if the cosmic 3-sphere, including
its 4D interior, actually is a 4-sphere cap?

And what if this 4-sphere, including
its 5D interior, actually is a 5-sphere cap?

& cetera ad infinitum?

There exist MANY graphs like the one to the right!



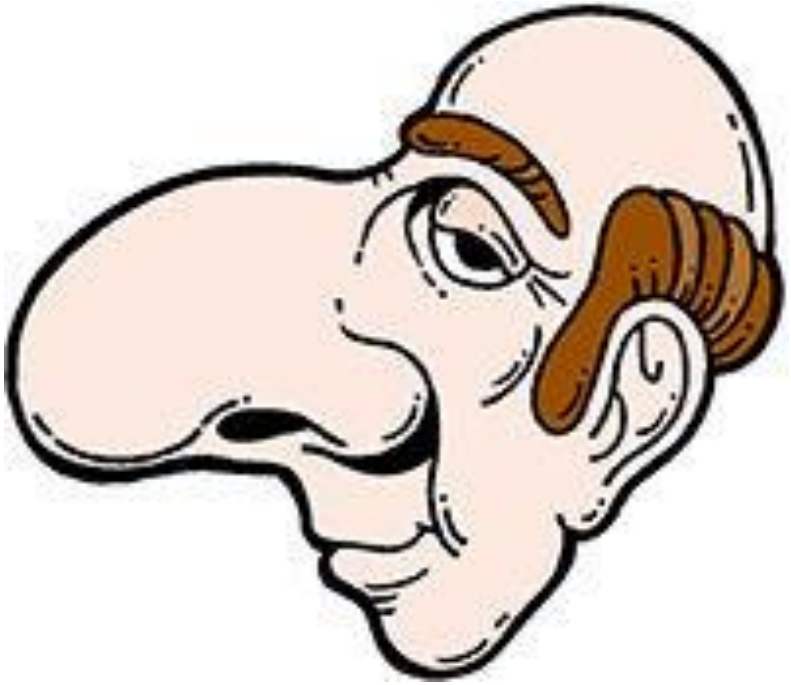


YET NOBODY HAS SEEN THEY DIRECTLY CONFIRM 3–SPHERICALITY!

Homo ~~sapiens~~ stultus.

The universe is a 3–sphere;

dat staat als een paal boven water.



it is as plain as the nose on your face.

https://mapio.net/pic/p-47099538/ http://www.idioms4you.com/complete-idioms/as-plain-as-the-nose-on-your-face.html

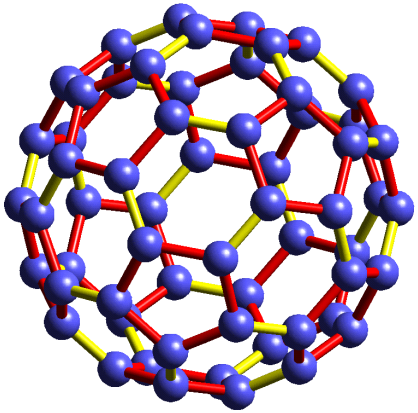
De Cocksdorp, Texel (NL)

Who would deny it if it endures?

(better translation: "would endure")

EINSTEIN: [...] And here I will say that the scientist finds his reward in what Henri Poincaré calls the joy of comprehension, and not in the possibilities of application to which any discovery of his may lead.

From: Where is science going *by Max Planck, 1932, p.211*



When I am working on a problem, I never think about beauty, but when I have finished, if the solution is not beautiful, I know it is wrong.

Richard Buckminster Fuller

But alas, the buckyball (C_{60}) is not a 3-sphere...

Mundus glomus est;

ex obſervatis phænomenis deductum eſt & hypotheſes non finxi.

Henk Reints
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Please visit:
http://henk-reints.nl/UQ/index.html
and read all documents.