

**PRESUMPTION:** *the characteristics of neutrons never changed during the entire lifetime of the universe.*

Claim: *When calculating cosmic expansion backwards, it is unavoidable to reach a (mean) universal density equal to that of neutronium. Beyond that point (i.e. earlier in time), **nothing at all** can be **deduced** from **ascertained truths**.*

Definition: **IniAll** := *initial cosmos in the form of one single clump of neutronium, i.e. Georges Lemaître's *atome primitif*.*

Hubble constant used here:  $H = 71 \text{ km/s/Mpc} \approx 2.30 \times 10^{-18} \text{ /s}$   
Hubble time:  $t_H = \frac{1}{H} \approx 13.77 \text{ Ga}$   
Speed of light:  $c := 299\,792\,458 \text{ m/s}$   
Hubble distance:  $D_H = ct_H \approx 13.77 \text{ Gly} \approx 1.30 \times 10^{26} \text{ m}$

### The cosmos definitely is a 3-sphere, a glome!<sup>1</sup>

Antipodal distance equals<sup>1,2</sup>  $D_H$ :  $D_{AP} = D_H$   
Volume of a 3-sphere:  $V_{3S} = \frac{2}{\pi} D_{AP}^3$  (actually the 3-surface)  
Schwarzschild radius of cosmos equals<sup>1,2</sup>  $D_H$ :  $R_{S,U} = \frac{2GM_U}{c^2} = D_H$   
Mass of universe:  $M_U = \frac{c^2 D_H}{2G} \approx 8.75 \times 10^{52} \text{ kg}$   
Mass of neutron:  $m_n \approx 1.674\,927\,500\,56 \times 10^{-27} \text{ kg}$  (CODATA 2022)  
No. of neutrons in **IniAll** is:  $N_n = \frac{M_U}{m_n} \approx 5.23 \times 10^{79}$   
Radius of neutron<sup>3</sup>:  $r_n \lesssim 0.84 \text{ fm}$  (less than but nearly equal to)  
Close-packing factor:  $V_{\text{gross}}/V_{\text{net}} = 3\sqrt{2}/\pi$   
Gross volume of neutron:  $\frac{3\sqrt{2}}{\pi} \frac{4\pi}{3} r_n^3 = 4\sqrt{2} r_n^3 \approx 3.35 \times 10^{-45} \text{ m}^3$   
Gross volume of **IniAll**:  $V_I = N_n 4\sqrt{2} r_n^3 \approx 1.75 \times 10^{35} \text{ m}^3 \approx 52 \text{ au}^3$   
**IniAll** was 3-spherical (of course!):  $V_I = \frac{2}{\pi} D_{AP,I}^3$   
Therefore:  $D_{H,I} = D_{AP,I} = \sqrt[3]{\frac{\pi}{2} V_I} = r_n \sqrt[3]{2\pi\sqrt{2} N_n}$   
Initial Hubble distance:  $D_{H,I} \approx 6.5 \times 10^{11} \text{ m} \approx 4.35 \text{ au}$   
OR, **sillily** denying cosmic 3S geometry:  $R_I = \sqrt[3]{\frac{3}{4\pi} V_{U,I}} \approx 3.5 \times 10^{11} \text{ m} \approx 2.32 \text{ au}$

At the **density** of **close-packed neutronium**, the **IniAll** would have had a **Hubble distance** of **4.35 astronomical units**.

SingularitechehehehHhahhHhahahahaaaaagngnkrrgg...

*Extremely plausible: mathematical impossibility  $\Rightarrow$  physical impossibility.*  
**FLAWED** Modus Ponens inversion: *mathematical truth  $\Rightarrow$  physical truth.*

<sup>1</sup> See: <https://henk-reints.nl/astro/HR-Geometry-of-universe-slideshow.pdf> .

<sup>2</sup> This follows from the Cosmological Principle, saying the cosmos is homogeneous and isotropic if considered at a sufficiently large scale. It implies the cosmos has no boundaries. Would there be two different characteristic universal distances, one could be beyond the smallest but within the largest, hence the smallest would be an internal boundary. The quintessence of a boundary is that things are different beyond it, which violates the homogeneity. Proof by contradiction then says there cannot be two different characteristic universal distances.

<sup>3</sup> See: <https://henk-reints.nl/HR-Existance-postulate.pdf> .