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This is an overview of my view on black holes,

see also http://henk-reints.nl/astro/HR-on-the-universe.php and http://henk-reints.nl/UQ

From a distance

Suppose you see me falling into a black hole. Well, as a matter of fact, you won't. Observed from a *distance*, you'll see me asymptotically approach the *Schwarzschild radius*, which takes infinitely long, so you'll see me forever falling towards it and you'll never see me disappear. From your perspective, my *velocity* with respect to the black hole first increases but then it will asymptotically decrease to nought. This is caused by *gravitational time dilation*, which for you will approach *infinity* as I am getting closer and closer to the black hole's *Schwarzschild radius*.

My local frame

In my own local frame I'll simply fall into the black hole, i.e. pass the *Schwarzschild radius*, in a finite amount of *time*. Nope. In my local frame I'm located at the origin where I'll stay put. That's one of the essential aspects of a local frame. The black hole is falling towards me at an ever increasing *velocity*, which causes *Lorentz contraction.*

> *Please note: prof. Hendrik Antoon Lorentz was a Dutchman and so am I.*
> *Proper pronunciation of his name is with the first syllable being the stressed one.*

The black hole will swallow me after a finite amount of *time*, when its event horizon touches me and just at that moment it has achieved the very *speed of light*. At that *velocity* the

Lorentz contraction: $$l = l_0 \cdot \sqrt{1 - \frac{v^2}{c^2}} \qquad [1]$$

yields: $$\sqrt{1 - \frac{(v=c)^2}{c^2}} = Sweet\ Fanny\ Adams. \qquad [2]$$

Hence the entire *Schwarzschild sphere* has been flattened to diddly squat[1]. At that very moment it no longer has any *depth* at all (as observed in my local frame), so apart from its *mass*, the black hole does not have any *interior*. It's a meaningless concept in this situation. This zero *depth* implies it has zero *resilience* and it is completely impenetrable. This "pancakified" black hole is a massive thing which directly hits me at the *speed of light*. To me it's plausible I'll be pounded to elementary particles and I'll definitely become part of the black hole's *mass*. Immediately. No *time delay* at all. Between the *Schwarzschild radius* and the centre of the black hole there's nothing at all, not even empty space. No *distance*. Effectively, it would be a singularity where the mutual *velocity* between me and the black hole decelerates from c to nought in zero *time*.

So at the very moment the black hole's event horizon touches me, Its central *mass* collides with me. That means in my local frame our *mutual distance* equals nought. Could that be different in *its*?

Its own local frame

In 1783, John Michell[2] already argued that light would not be able to escape if a star were large enough. Simple Newtonian gravitation yields

the *escape velocity*: $$v_e = \sqrt{\frac{2Gm}{r}} \qquad [3]$$

which equals the *speed of light*: $$v_e = c \qquad [4]$$

at a *distance* of: $$r_s = \frac{2Gm}{c^2} \qquad [5]$$

The first solution of the Einstein equation[3] was found by Karl Schwarzschild[4]. It implies that the closer you get to the *point mass*, the "weirder" geometry becomes, and the *distance* given by [5] marks a coordinate singularity. It is the *Schwarzschild radius*.

In its own local frame, the black hole sees me falling inwards and after a finite amount of *time* it sees me pass this *Schwarzschild radius* (i.e. enter the corresponding sphere). Gotcha! Yep, but nope. I will not pass it, since it must be nought.

Einstein himself had already derived the following (using K for the *constant of gravitation* which we nowadays write down as G).

German publication in Annalen der Physik, 1916, contains a (typing) error:	English version (Collected Papers volume 6, Princeton University Press, 1997):
(69) $\kappa = \frac{8\pi K}{c^2}$ (70a) $\alpha = \frac{\kappa M}{8\pi}$ (71) $dx = 1 - \frac{\alpha}{2r}$ Der Einheitsmaßstab erscheint also mit Bezug auf das Koordinatensystem in dem gefundenen Betrage durch das Vorhandensein des Gravitationsfeldes verkürzt, wenn er radial angelegt wird.	(69) $\kappa = \frac{8\pi K}{c^2}$ (70a) $\alpha = \frac{\kappa M}{4\pi}$ $\therefore \alpha = \frac{2Gm}{c^2}$ [6] (71) $dx = 1 - \frac{\alpha}{2r}$ $\therefore dx = 1 - \frac{Gm}{rc^2}$ *The unit measuring rod thus appears a little shortened* [Traduttore traditore: the German text does not mention anything that can be translated as "a little"] *in relation to the system of co-ordinates by the presence of the gravitational field, if the rod is laid along a radius.*

Einstein says formula (71) is a first order approximation of the amount by which a rod shortens. He found *gravitational length contraction*. Obviously, [6] is identical to [5], the *Schwarzschild radius*. The formula approximated by (71) (in the English version) follows from the Schwarzschild solution and it is:

$$l = l_0 \cdot \sqrt{1 - \frac{2Gm}{rc^2}} \qquad [7]$$

in which we can insert [5], yielding:

$$l = l_0 \cdot \sqrt{1 - \frac{r_s}{r}} \qquad [8]$$

or [3], from which we obtain:

$$l = l_0 \cdot \sqrt{1 - \frac{v_e^2}{c^2}} \qquad [9]$$

Please note the correspondance of [9] and [1].

By putting r equal to r_s in [8] we get:

$$\sqrt{1 - \frac{r_s}{r = r_s}} = 0 \qquad [10]$$

and insertion of [4] into [9] of course yields the same:

$$\sqrt{1 - \frac{(v_e = c)^2}{c^2}} = 0 \qquad [11]$$

This means that from the perspective of the *point mass*, the entire Schwarzschild sphere has been gravitationally contracted to... zilch! Same conclusion as above: the black hole does not have any *interior*. It's a meaningless concept, as well as are all considerations and formulas regarding it. Apart from the central *mass* there's nothing inside, not even empty space. The *Schwarzschild radius* manifests only when observed from a *distance*. It is a sort of optical illusion for distant observers.

And please don't make the mistake to consider $\rho = \frac{m}{\frac{4\pi}{3} r_s^3} = \frac{m}{\frac{4\pi}{3}\left(\frac{2Gm}{c^2}\right)^3} = \frac{3c^6}{32\pi G^3 m^2}$ a black hole's density.

Speed limit of light

As can easily be seen in [1], v cannot ever exceed c, since the square root of a negative number doesn't have a real solution, i.e. it does not exist. Another way to see this is that at the *speed of light*, a rod's *length* is contracted to zero, and it cannot become shorter than that. Therefore *superluminality* is a meaningless concept, so please banish it from your (un)consciousness, or Captain Mainwaring[5] will call you a stupid boy...

Now look at [8]. For the very same reason why v cannot ever exceed c, r cannot ever be less than r_s. Nearer to the *point mass* than r_s simply is fundamentally impossible. Another way to derive this is that if you would really fall into the Schwarzschild sphere, you would continue to accelerate, thereby exceeding the *speed of light*, which is impossible. This implies there cannot exist any spatial interior of the Schwarzschild sphere. So please banish the concept of "inside a black hole" from your (un)consciousness, or Captain Mainwaring will call you a stupid boy...

For a distant observer, there exists a Schwarzschild sphere, but it is an inflated nought. Apart from the central massive thing, it contains nothing at all and not even that. Not even empty space.

Finite infinity

Einstein wrote[1]:

> Für Überlichtgeschwindigkeiten werden unsere überlegungen sinnlos; wir werden übrigens in den folgenden Betrachtungen finden, daß die Lichtgeschwindigkeit in usererer theorie physikalisch die Rolle der unendlich großen Geschwindigkeiten spielt.
> *For superluminal velocities, our deliberations become senseless; moreover, in what follows we will find that in our theory the speed of light plays the role of the infinite velocities.*

So the *speed of light* is as if *infinity* has been drawn into *finitude*.

Now let's consider the *distance* between me and the *point mass* with which I'll collide. Or better its reciprocal, which of course is the *proximity*. Then you, at a small *proximity* (i.e. a great *distance*), see the *Schwarzschild proximity* as a finite value that cannot ever be exceeded, a finitude playing the role of the infinite *proximities*. Hey, just read something like that, a déjà vu?

For me, as well as for the massive thing, it takes a finite amount of *time* until we collide, while you forever keep thinking I'm approaching it. This finite *time*, which applies both to me and the massive thing, plays the role of what to you is *temporal infinity*. Déjà vu?

Schwarzschild shell

Relativity is about the geometry of empty space and time, not about matter, certainly not the "inside" of elementary particles. **IF** elementary matter would not be compressible to nought (based on my thought that *an entity cannot be or exist unless it is able to fully manifest all of its properties*, which - due to *mass*-dependent spatial properties (such as r_s and λ_c) - would imply a minimal space requirement for entities having a *mass*, see my main document), then the actual *mass* of the black hole cannot be a true *point mass* and it cannot be (Lorentz or gravitationally) contracted to nought. It also implies the initial singularity in the standard big bang theory would not be possible at all, but doesn't "singularity" already indicate something that is even mathematically impossible, such as division by zero? And what is mathematically impossible must certainly be physically impossible, so please forget about any type of physical singularity, or Captain Mainwaring...

The Schwarzschild sphere would be a shell around the massive thing, but only for the distant observer. For the thing itself this shell has zero *thickness*, as well as for any incoming objects at the event of a collision (in their own local frame).

Spaghetti pancake

As explained, the black hole falling towards me will become pancakified due to extreme *Lorentz contraction* as perceived in my local frame. But from the black hole's point of view, it is I (not Leclerc[6]) who'll be contracted to nought.

In my own frame I will not be contracted, but then I'll get spaghettified by *tidal forces*, which are NOT smaller for a larger black hole since $r_s \to 0$ when its *velocity* approaches c, as explained, so I will come as close to it as can be. Too close, actually...

In the black hole's frame my inward *velocity* will cause mr. Lorentz to contract me to a spaghetti pancake, which makes me fit in the gravitationally contracted space around the central thing.

In your frame, as seen from a *distance*, you'll see me become gravitationally contracted to nought during an endless time span and since you'll see my *velocity* declining to nought, so you won't see me Lorentz contracted. And of course you will not see me pass the *Schwarzschild radius*. How could I, as the latter merely is an illusion. A blown-up nought with no inside, not even empty space. A coordinate singularity, not a physical one.

Altogether

The Schwarzschild sphere around a *point mass* applies only to observers at a *distance*. It is a sort of optical illusion. In the *point mass*'s own local frame it is gravitationally contracted to nought and in the local frame of an object falling into it (i.e. seeing the *point mass* falling towards *it*), it is fully Lorentz contracted to zero. This implies there is no event horizon beyond which unobservable events might occur. The Schwarzschild sphere as seen from a *distance* does not have any spatial interior. For the colliding bodies, i.e. me and the black hole, space is a continuous entity, whilst distant observers are being fooled by an inflated nought. The only singularity would be the final $\frac{dv}{dt} = \frac{c}{0} = ?$ But, as explained above, I am convinced physical singularities are totally impossible. Wouldn't it be plausible that THE THING will have some non-zero resilience?

Near infinity

Let's do a little bit of maths.

Consider: $$f(x,p) = \int_1^x u^{-(p+1)}\,du = \begin{cases}(1-x^{-p})/p\,, & p \neq 0\\ \ln(x)\,, & p = 0\end{cases}$$

it has: $$\lim_{x\to\infty} f(x,p) = \begin{cases}1/p\,, & p > 0\\ \infty, & p \leq 0\end{cases}$$

and: $$\lim_{x\downarrow 0}\ f(x,p) = \begin{cases}1/p\,, & p < 0\\ \infty, & p \geq 0\end{cases}$$

so if:	$p < 0$	$p = 0$	$p > 0$
then $f(x,p) =$	$(1-x^{-p})/p$	$\ln(x)$	$(1-x^{-p})/p$
and:	$\lim\limits_{x\to\infty} = \infty$	$\lim\limits_{x\to\infty} = \infty$	$\lim\limits_{x\to\infty} = \frac{1}{p} > 0$
as well as:	$\lim\limits_{x\downarrow 0} = \frac{1}{p} < 0$	$\lim\limits_{x\downarrow 0} = -\infty$	$\lim\limits_{x\downarrow 0} = -\infty$

So $\frac{1}{p}$ is an asymptote if $p > 0$ and a pole if $p < 0$ (for now I'll call it an *asympole*), and we've got:

$$\lim_{p\downarrow 0} = +\infty \qquad \text{as well as:} \qquad \lim_{p\uparrow 0} = -\infty$$

For any non-zero p, one end of this function goes deeper into *infinity* the farther p is away from zero, and the other end approaches the asympole (and thus remains finite). The asympole itself goes to positive or negative *infinity* as p approaches zero.

Only for $p = 0$, i.e. $f(x) = \ln(x)$, both ends approach *infinity*. For $p = 0$ the asympole itself has just reached *infinity* with the narrowest of margins. It'll be finitised by any infinitesimal (i.e. non-zero) value of p. This means both ends of $\ln(x)$ are having a sort of first encounter with *infinity*, they touch just and only its "near edge". I'll call it *nearest infinity* (but please keep in mind there are functions that go to *infinity* far slower than $\ln(x)$, like $\ln(\ln(x))$, which of course is a trivial example).

Black hole genesis

Consider a spherical thing that occupies more space than the *volume* of its own Schwarzschild sphere. That's not a black hole, but it will gather other *masses* falling towards it, and it takes only a finite *time* for them to collide, even when observed from a great *distance*, since it's not a black hole. Due to the incoming matter it'll get heavier and heavier, so its *Schwarzschild radius* is growing and when its *mass* exceeds $\sqrt{3c^6/32\pi G^3\rho}$ ($\approx 3.64\odot$ for the *density* of neutronium, see the Black Holes section in my main treatise), r_s will be greater than the *mass*'s *radius* (≈ 10.75 km for neutronium). Then it has become a black hole and no object can ever be watched falling into it, as seen from a *distance*. The *total free fall time* as seen by a distant observer has just barely "touched" *infinity*, coming from *finitude*.

But isn't that precisely what I've just called *nearest infinity*, which IS *infinity*? And doesn't this mean the birth of a black hole takes an infinite amount of *time* as seen by a distant observer?

Can *temporal infinity* have occurred within a finite *time*? Nope. But isn't the *age* of the universe finite?

This implies a merger of for example two neutron stars into a black hole cannot yet ever have been observed. Of course its initial phase can, but it'll take infinitely long until it has turned into a black hole, which we'll never be able to witness. In spite of the detection of gravitational waves, a black hole's birth has not yet ever been and will never be observed. The birth of a non-primordial black hole is an event at the end of *time*, in the most extreme future. By the way, the future no longer is what it used to be...

In spacetime as observed/experienced from anywhere in the universe not near a black hole, there can exist not even one single black hole that has come into being during the finite *age* of the universe since the big bang. ALL must be primordial. Massive remnants of the big bang itself. So please banish the concept of *becoming a black hole* from your (un)consciousness, or Captain Mainwaring...

Common sense is not so common.
Voltaire, A Pocket Philosophical Dictionary[7].

Common sense is the most widely shared commodity in the world,
for every man is convinced that he is well supplied with it.
René Descartes[7].

Hypothefes non fingo.
I don't come up with fabrications.
Sir Isaac Newton[8].

References:

[1] Albert Einstein, Zur Elektrodynamik bewegter Körper, Annalen der Physik 17, 891-921 (1905) - p.903: § 4: Physikalische Bedeutung der erhaltenen Gleichungen, bewegte starre Körper und bewegte Uhren betreffend: "Für $v = V$ schrumpfen alle bewegte Objecte - vom "ruhenden" System aus betrachtet - in flächenhafte Gebilde zusammen." *For $v = c$ all moving objects - viewed from the "stationary" system - shrivel up into planar structures*.

[2] Schaffer, Simon (1979)."John Michell and Black Holes". Journal for the History of Astronomy. 10: 42–43. Bibcode:1979JHA....10...42S. doi:10.1177/002182867901000104
(this reference was copied from https://en.wikipedia.org/wiki/Schwarzschild_radius#cite_note-Schaffer-5).

[3] Albert Einstein, Die Grundlage der allgemeinen Relativitätstheorie, Annalen der Physik 49 (1916), pp.769-822.

[4] K. Schwarzschild. Über das Gravitationsfeld eines Massenpunktes nach der EINSTEINschen Theorie. Reimer, Berlin 1916, pp.189-196.

[5] https://en.wikipedia.org/wiki/Captain_Mainwaring

[6] https://www.youtube.com/watch?v=ZelPcA2Dz2c

[7] https://www.goodreads.com/quotes/tag/common-sense

[8] Isaac Newton, Scholium Generale, Philosophiæ Naturalis Principia Mathematica, ed.2 (1714) p.484, ed.3 (1726) p.530.