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The Particle Problem in the General Theory of Relativity

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§2. The Schwarzschild Solution

As is well known, Schwarzschild found the spherically symmetric static solution of the gravitational equations

$$ds^{2} = -\frac{1}{1 - 2m/r} dr^{2} - r^{2}(d\theta^{2} + \sin^{2}\theta d\phi^{2}) + (1 - 2m/r)dt^{2}, \quad (5)$$

(r > 2m, \theta from 0 to \pi, \phi from 0 to 2\pi); the vari-

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If one introduces in place of r a new variable according to the equation $u^{2} = r - 2m,$ one obtains for ds^{2} the expression $ds^{2} = -4(u^{2} + 2m)du^{2}$ $-(u^{2} + 2m)^{2}(d\theta^{2} + \sin^{2}\theta d\phi^{2}) + \frac{u^{2}}{u^{2} + 2m}dt^{2}.$ (5a)

It should be obvious that u^2 has dimension [LENGTH], hence u has dimension $\sqrt{[LENGTH]}$. This implies that u definitely is not a normal spatial dimension!

But what are Einstein & Rosen doing?

As u varies from $-\infty$ to $+\infty$, r varies from $+\infty$ to 2m and then again from 2m to $+\infty$. If one tries to interpret the regular solution (5a) in the space of r, θ , ϕ , t, one arrives at the following conclusion. The four-dimensional space is described mathematically by two congruent parts or "sheets," corresponding to u > 0 and u < 0, which are joined by a hyperplane r = 2m or u = 0 in which g vanishes.² We call such a connection between the two sheets a "bridge."

Nowadays, this bridge is called a **wormhole**. Mathematically, it is perfect, but it has nothing to do with physics. **u** is neither spatial nor timelike, said otherwise: it's **flapdoodle**.

A wormhole is not to be considered physically possible at all.



But it is Einstein himself

who is mentioned as the primary author!

Yeah.

He also wrote: Autoritätsdusel ist der größte Feind der Wahrheit. Dizzily relying on authority is the greatest enemy of truth. Duizelig steunen op autoriteit is de grootste vijand van de waarheid.

Beautyful image, but physical nonsense:



Shouldn't it be a paraboloid (given $u^2 = r - 2m$)?

Stars outside the cosmos?

180° curvature?



Farting?

The (f)artist: https://www.shutterstock.com/g/eugendobric states: Only our imagination is the limit. Okay, but for a physicist, truth should be the limit.