Hubble's law, and the Lorentz factors in the model Universe

$$dt = \left(1 - \frac{v_{escape}^2}{c^2}\right)^{-\frac{1}{2}} dt'$$

$$dr = \left(1 - \frac{v_{escape}^2}{c^2}\right)^{\frac{1}{2}} dr'$$

v_{escape}

r

R

c

c

c

c

$c = HR$

$v_{escape} = Hr$

$c = the\ speed\ of\ light$

$$\frac{2GM}{rc^2} = \frac{v_{escape}^2}{c^2}$$

$$\frac{G\rho_{critical}\,\pi r^2}{3\,c^2} = \frac{v_{escape}^2}{c^2}$$

$$v_{escape} = \left(\frac{G\rho_{critical}\,\pi^2}{3\,c^2}\right)^{\frac{1}{2}} r$$

$$H = \left(\frac{G\rho_{critical}\,\pi^2}{3\,c^2}\right)^{\frac{1}{2}}$$
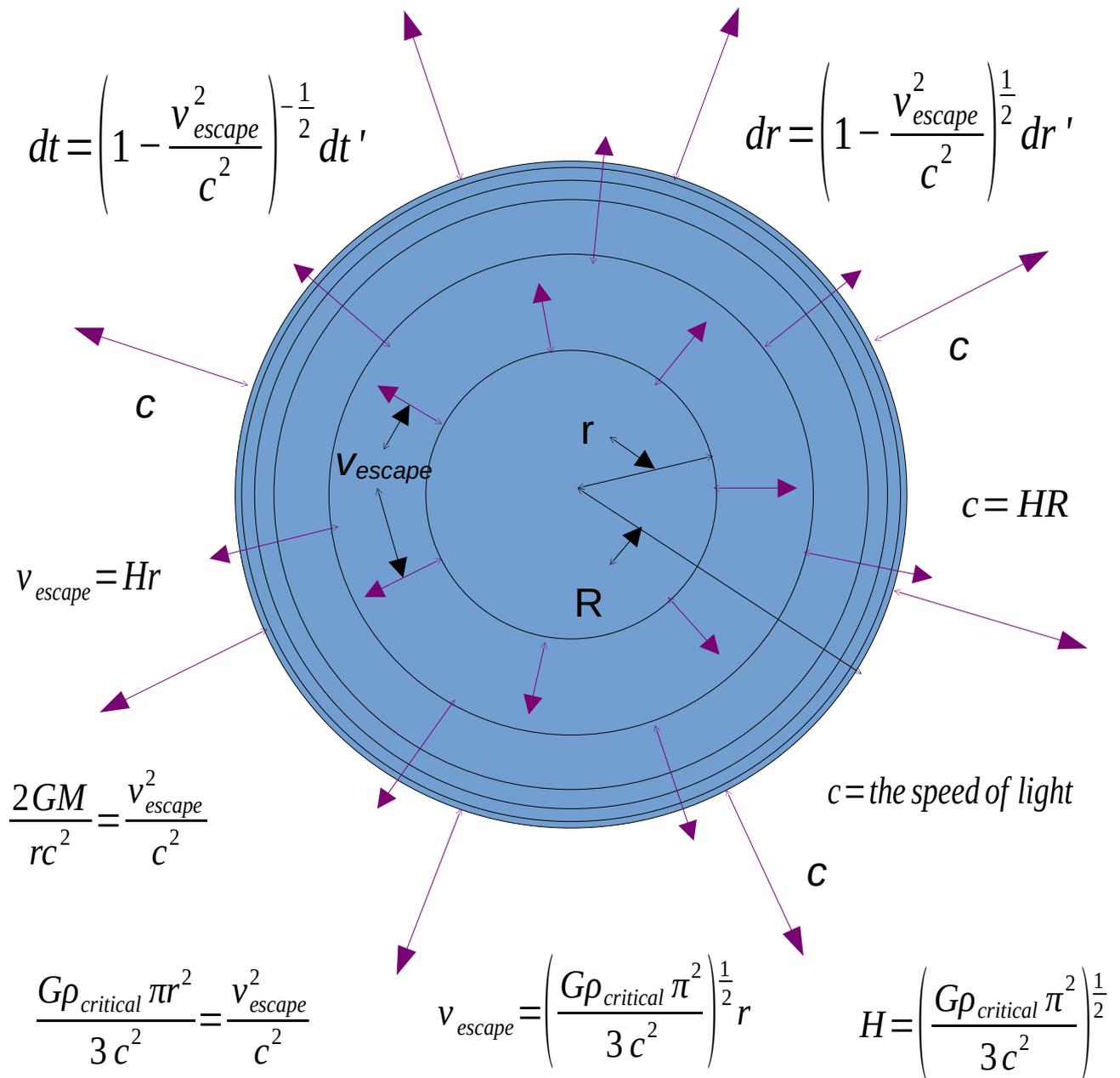
Hartle's result for escape velocity tells us that the edge to the model Universe at a radius R, where the shells are infinitely thin, is also where the escape velocity is the speed of light.

All the comoving massive bodies in this Universe will be gravitationally length contracted, and time dilated, so as to give all comoving observers a uniform speed of light