Skipping nucleosynthesis in detail due to snow.

Continuing with relativity as it is needed for understanding of large scale universe.

"Inertial system" = freely falling Time Dialation as a consequence

⇒ time elapses at different rates at different heights.

$\frac{-\Delta t}{t} \approx 10^{-16}/m$ light leaving surface will be red shifted.

clocks on satilites of 100 km will be an order of 10^{-11} s faster than clocks on the ground

gps satilite of 20,000 km will be on order of $2 \cdot 10^{-9}$ s difference limiting precision to 1 ft without compensation

$R_s = \frac{2GM}{c^2} = 3\,km \cdot \frac{M}{M_\odot}$ $\Delta t_{local} = \sqrt{1 - \frac{R_s}{r}}\,\Delta t_{\infty}$

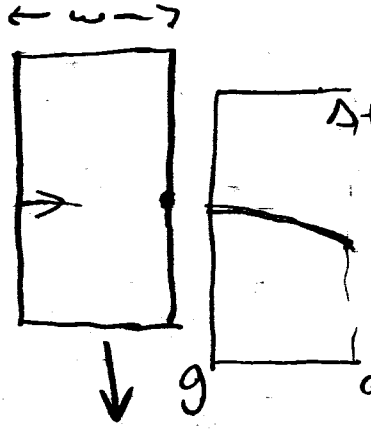
↳ Event Horizon

we "see" objects falling through event horizon frozen on the surface of horizon.

an observer falling through the horizon does not perceive anything special.

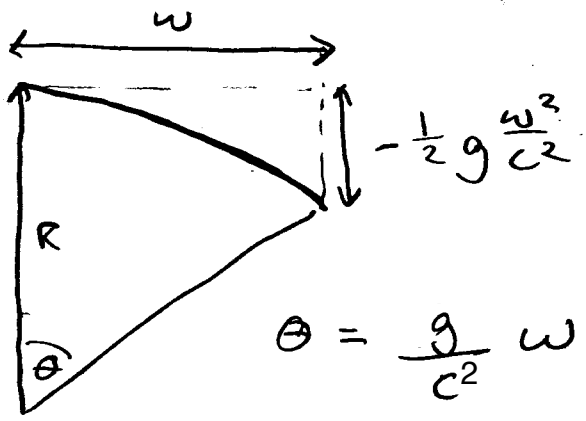
Bending of Light

back to the elevator



observer inside elevator sees straight path

observe external sees light hit the same point so the light must have fallen as well following a curved path.



$$\theta = \frac{g}{c^2} w$$

= R[cos(theta)-1]
approx. = -1/2 R theta^2

w approx. = R theta =>
theta = g w/c^2