

$$\lambda_{obs} \sim \frac{2Gm}{c^2} (1+z) \sqrt{\frac{H_0^{-1}}{6\,k\Omega_\Lambda^{1/2}} \sinh^{-1} \left[\left(\frac{\Omega_\Lambda}{\Omega_M} \right)^{1/2} (z+1)^{-3/2} \right]}$$