

IntroCosmo24

Homework problems #5

Due November 28, 2024

1. At present the Hubble constant is $H = 70\text{km/sMpc}$. Express H in units of $1/s$ and $1/yrs$ and provide an estimate of the age of the Universe.
2. Using the Hubble's law estimate the distance to the furthest galaxies that can be observed. This distance is called the Hubble horizon. Express this distance in Mpc and ly. Estimate how many galaxies are contained in a sphere with the radius equal to the Hubble horizon, how much mass in units of M_{\odot} it contains and how many baryons (protons or neutrons)?
3. Vesto Slipher estimated the redshift of the Andromeda nebula to be $v/c \approx 0.001$. How massive should be Andromeda nebula to produce such gravitational redshift? Comments are welcome.