0.01 galaxies / $(Mpc)^3$

ranges from 0 – 100's

$z = \frac{\lambda_{obs}}{\lambda_{emit}} - 1$ Redshift

proxy for distance
age

cluster $\simeq$ 1 Mpc, 100 galaxies
↳ 10^{13} stars

mass: $\simeq 2 \cdot 10^{14} M_\odot$

Cosmic ν-wave background CMB

special relativity: $z - 1 = \sqrt{\frac{1 + v/c}{1 - v/c}} \Rightarrow z \approx \frac{v}{c}$

happened $\simeq$ 400,000 yrs ABB

we: 13.7 B yrs A BB