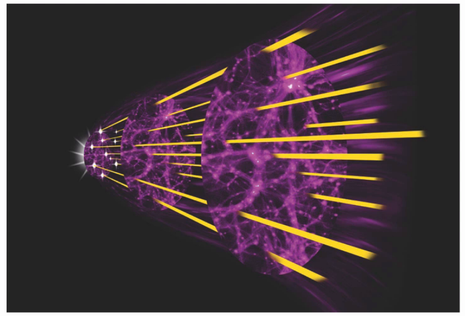
The Age of the Universe

1

To find the age of the Universe (i.e., how long its been expanding), reverse the expansion



2

The age can be found by dividing the distance of galaxies by their velocity

$$T_0 = \frac{d}{V}$$

But recall that the distance and velocity of galaxies are related by the Hubble law

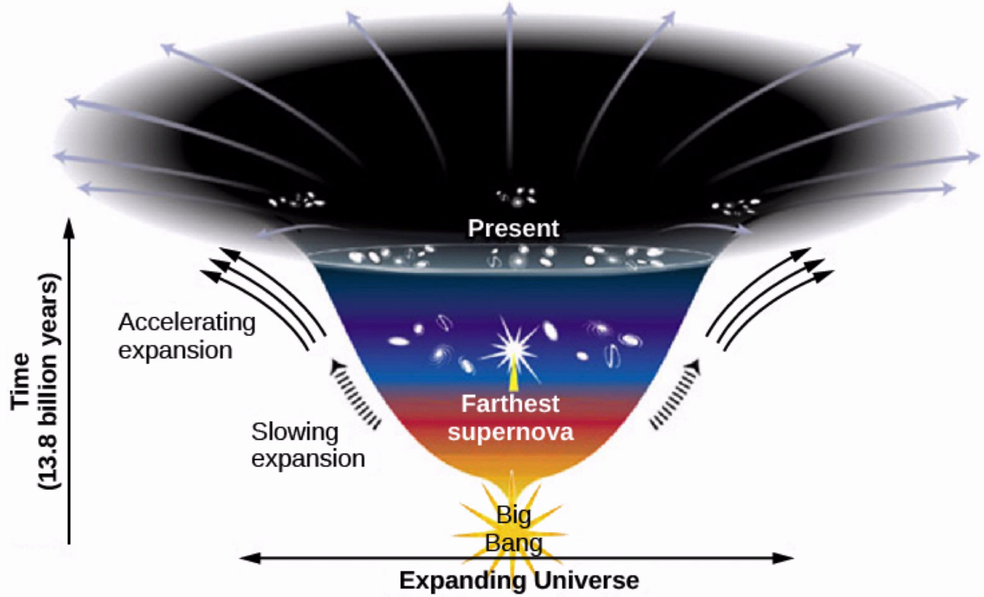
$$V = H \times d$$

Combining the formulae:

$$T_0 = \frac{1}{H}$$

3

A complication: the rate of expansion has not been uniform. Early on, the rate slowed due to the pull of gravity. More recently, it has been accelerating due to a mysterious phenomenon known as dark energy



4

Accounting for these complications, our current estimate for the age is 13.8 billion years, with an uncertainty of 100 million years