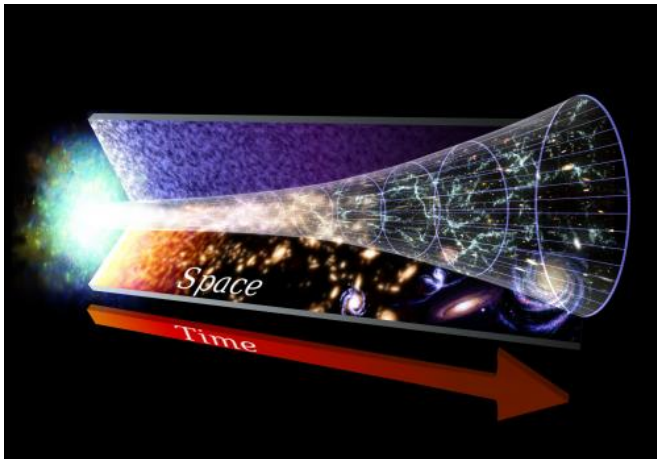


How fast is the universe expanding?

10 February 2015, by Brian Koberlein



Artists illustration of the expansion of the Universe.
Credit: NASA, Goddard Space Flight Center

The Universe is expanding, but how quickly is it expanding? How far away is everything getting from everything else? And how do we know any of this anyway?

When astronomers talk about the expansion of the Universe, they usually express it in terms of the Hubble parameter. First introduced by Edwin Hubble when he demonstrated that more distant galaxies are moving away from us faster than closer ones. The best measurements for this parameter gives a value of about 68 km/s per megaparsec.

Let's recap. Hubble. Universe. Galaxies. Leaving. Further means faster. And then I said something that sounded like "blah blah Lando blah blah Kessel Run 68 km/s per megaparsec". Which translates to if you have a galaxy 1 megaparsec away, that's 3.3 million light years for those of you who haven't seen Star Wars, it would be expanding away from us at a speed of 68 km/s. So, 1 megaparsec in distance means it's racing away at 68 km/s.

This is all because space is expanding everywhere in all places, and as a result distant galaxies appear to be expanding away from us faster than closer ones. There's just more "space" to expand between us and them in the first place. Even better, our Universe was much more dense in the past, as a result the Hubble parameter hasn't always had the same value.

There are two things affecting the Hubble parameter: dark energy, working to drive the Universe outwards, and matter, dark and regular flavor trying to hold it together. Pro tip: The matter side of this fight is currently losing.

Earlier in the Universe, when the Hubble parameter was smaller, matter had a stronger influence due to its higher overall density. Today [dark energy](#) is dominant, thus the Hubble parameter is larger, and this is why we talk about the Universe not only expanding but accelerating.

Our cosmos expands at about the rate at which space is expanding, and the speed at which objects expand away from us depends upon their distance. If you go far enough out, there is a distance at which objects are speeding away from us faster than the speed of light. As a result, it's suspected that receding galaxies will cross a type of cosmological event horizon, where any evidence of their existence, not even light, would ever be able to reach us, no matter how far into the future you went.

What do you think? Is there anything out there past that cosmological event horizon line waiting to surprise us?



Expansion of the Universe. Credit: Eugenio Bianchi, Carlo Rovelli & Rocky Kolb.

Source: [Universe Today](#)

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