8.286 Lecture 5
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THE KINEMATICS of the HOMOGENEOUS EXPANDING UNIVERSE, PART 2

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In 2001 the Hubble Key Project Team announced its final result, $H_0 = 72 \pm 8$ km-s^{-1}-Mpc^{-1}, a considerable improvement over the large uncertainty expressed in Eq. (2.2) — W. L. Freedman et al., "Final results from the Hubble Space Telescope Key Project to measure the Hubble Constant," *Astrophysical Journal,* vol. 553, pp. 47–72 (2001).

Hubble Constant Discrepancy

- Measurements of H_0 from the CMB tend to get low-ish values. For example, the Planck 2015 value is 67.7 ± 0.5 km-s^{-1}-Mpc^{-1}.
- Direct astronomical measurements tend to get higher values. For example, Riess et al. 2016 find 73.0 ± 1.8 km-s^{-1}-Mpc^{-1}.

The discrepancy is about 2.8σ from these numbers, but Wendy said the discrepancy is about 3.4σ and getting larger. In particular, the data release from the Gaia satellite last week, measuring precise positions (~ 10 micro arcseconds of arc) of a billion stars, give good confirmation of the distance scales based on Cepheid variables.