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An Independent Measurement of H0 from Lensed Quasars

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Strong gravitational lens systems with time delays between the multiple images are a powerful probe of cosmology, particularly of the Hubble constant (H0) that is key to probing dark energy, neutrino physics, and the spatial curvature of the Universe, as well as discovering new physics. The H0 Lenses In COSMOGRAIL's Wellspring (H0LiCOW) project has measured H0 from lensed quasars using deep Hubble Space Telescope and AO imaging, precise time delay measurements from the COSMOGRAIL monitoring project, a measurement of the velocity dispersion of the lens galaxies, and a characterization of the mass distribution along the line of sight. Our latest results from a total of six lenses constrains H0 to be 73.3(-1.8,+1.7) km/s/Mpc for a flat Lambda CDM cosmology, which is a measurement to 2.4% precision. These results are consistent with independent determinations of H0 using type Ia supernovae calibrated by the distance ladder method, and are in 3.1-sigma tension with the results of Planck CMB measurements. Combined with the latest distance ladder results from the SH0ES project, we find a 5.3-sigma tension between Planck and late-Universe probes, hinting at possible new physics beyond the standard LCDM model and highlighting the importance of this independent probe.

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