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**Title:** The Carnegie Hubble Program

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## Abstract

We present an overview of and preliminary results from an ongoing comprehensive program that has a goal of determining the Hubble constant to a systematic accuracy of 2%. As part of this program, we are currently obtaining 3.6 micron data using the Infrared Array Camera (IRAC) on Spitzer, and the program is designed to include JWST in the future. We demonstrate that the mid-infrared period-luminosity relation for Cepheids at 3.6 microns is the most accurate means of measuring Cepheid distances to date. At 3.6 microns, it is possible to minimize the known remaining systematic uncertainties in the Cepheid extragalactic distance scale. We discuss the advantages of 3.6 micron observations in minimizing systematic effects in the Cepheid calibration of the Hubble constant including the absolute zero point, extinction corrections, and the effects of metallicity on the colors and magnitudes of Cepheids. We are undertaking three independent tests of the sensitivity of the mid-IR Cepheid Leavitt Law to metallicity, which when combined will allow a robust constraint on the effect. Finally, we are providing a new mid-IR Tully-Fisher relation for spiral galaxies.

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