An Empirical Calibration of the Tip of the Red Giant Branch in the Near-Infrared[1] MAX NEWMAN, KRISTEN MCQUINN, Rutgers University — Precise distance measurements to nearby galaxies are fundamentally important in astrophysics. In particular, extragalactic distances have enabled precise local measurements of the Hubble constant. One of the most robust ways to measure distances to nearby galaxies is using the stable and predictable brightness of stars in a specific phase of stellar evolution, namely tip of the red giant branch (TRGB) stars. Traditionally, TRGB-based distances are best measured at optical wavelengths where the chemical content, or metallicity, of stars only modestly impacts the TRGB luminosity. The TRGB in the near-infrared (NIR) is up to 2 magnitudes brighter than in the optical, increasing the distance range over which precise TRGB-based distances are feasible. However, the NIR TRGB luminosity is expected to have greater metallicity dependence compared with the optical TRGB. Therefore, for the NIR TRGB to be used for precise distance measurements, the metallicity dependence must be carefully calibrated. To determine the calibration, we use new Hubble Space Telescope observations of 4 nearby galaxies with a range of metallicities. We present initial results, including a demonstration of how the NIR TRGB luminosity changes with metallicity.

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