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Abstract:

The dynamical mass, which probes the dark matter content of the halo, of early-type galaxies is difficult to measure because they lack easily accessible kinematic tracers at large radii. The unique configuration of a polar ring galaxy (PRG) — a central early-type galaxy encircled by a ring of young stars and gas — provides an important dynamic tracer of the system through the rotation velocity of the gaseous ring, which is detectable in neutral atomic gas (H I 21 cm). Very few PRGs have been studied to date. The existing data suggest that PRGs deviate from the Tully- Fisher relation of normal spiral galaxies. We propose to obtain deep and uniform H I observations of 21 kinematically confirmed PRGs, the largest and most comprehensive sample to date, to study their Tully-Fisher relation and dark matter halos. These observations are scientifically exciting and constrain the formation history of these peculiar gas-rich galaxies.