SPATIALLY-RESOLVED INTERNAL KINEMATICS OF $\langle z \rangle \approx 0.3$ FIELD GALAXIES: EVIDENCE FOR ROTATION

P. GUHATHAKURTA AND K. ING
UCO/Lick Obs., U. of Calif., Santa Cruz, CA 95064, USA
H.-W. RIX
Max-Planck-Inst. für Astrophysik, 85740 Garching, Germany
M. COLLESS
Mt. Stromlo & Siding Springs Obs., Canberra, Australia
AND
T. WILLIAMS
Rutgers University, Piscataway, NJ 08855, USA

The nature of evolution in faint field galaxies remains a mystery. The Tully-Fisher relation, empirically relating the intrinsic luminosity of a spiral galaxy to its rotation speed, is an important tool for constraining the amount of luminosity evolution in distant field galaxies. Studying the luminosity-vs-linewidth relation for distant galaxies allows one to compare the luminosity of local and distant galaxies. The customary measure of a galaxy's rotation speed is the width of an emission line. It is important, however, to test whether the linewidth is a reliable measure of the galaxy's rotation speed or if it is dominated by turbulent motion within HII regions. In order to do this, we study the spatially-resolved kinematics and distribution of O[III] gas in about ten $\langle B \rangle \sim 21$ field galaxies at $\langle z \rangle \approx 0.3$.

We have used the CTIO 4-m telescope with the Rutgers Fabry-Perot imaging interferometer. The 2.5Å etalon provides a resolution of ≈ 120 km/s which is sufficient to measure the linewidth of most galaxies. For each galaxy, a series of images stepped by 1Å (~ 50 km/s) was obtained, centered around the (known) redshift of the O[III] line ($\lambda_{\rm rest} = 5007$Å; $\lambda_{\rm obs} \approx 6500$Å). We have well-resolved velocity fields for most of the galaxies in the sample (typical galaxy size is 3″–4″; seeing was $\sim 1.3''$). Galaxy linewidths are significantly broader than the instrumental resolution. We compare the distribution of starlight and ionized gas, and study the O[III] velocity field. The largest galaxies show clear evidence of rotation.

https://doi.org/10.1017/S0074180900233044 Published online by Cambridge University Press