The Evolution of the Tully-Fisher Relation Since $z \approx 1$ with KROSS and SAMI

A. Tiley, M. Bureau, J. Stott (University of Oxford, United Kingdom), M. Swinbank, R. Bower, C. Harrison (Durham University, United Kingdom), A. Bunker (University of Oxford, United Kingdom), I. Smail (Durham University, United Kingdom), G. Magdis (University of Oxford, United Kingdom), H. Johnson (Durham University, United Kingdom)

The KMOS Redshift One Spectroscopic Survey (KROSS) aims to study the spatially-resolved dynamics, star formation and chemistry of ~ 1000 star-forming galaxies at $z \approx 1$. Here we begin to probe the epoch of peak star formation in the universe, a key era for galaxy mass assembly. The primary causes of this increased star formation are hotly debated, as are the dominant mechanisms for mass growth (e.g. major mergers, secular evolution). It is thus essential to determine how the ratio of stellar, gaseous and dark mass in galaxies has varied over cosmic time, and whether this is related to the global fall of star formation activity over the same period. Using a simple arctan function to model the spatially-resolved Hα kinematics of the KROSS galaxies, and SED fitting to retrieve stellar masses, I present the observed and baryonic Tully-Fisher relations (TFRs) for sub-samples of the ≈ 400 KROSS galaxies observed. I find a dependence of the KROSS TFRs on the relative importance of rotation and pressure support in galaxies (V/σ). I explore reasons for the increased intrinsic scatter found in all relations in comparison to $z \approx 0$. Considering only rotationally supported galaxies ($V/\sigma > 2.5$), there is an apparent evolution of the zero-point of the TFR (-1.8 mag and 0.54 dex for the absolute K-band and stellar mass TFR, respectively) since $z \approx 1$. For a given dynamical mass, galaxies had less stellar mass at $z \approx 1$ than today. The implications of this for galaxy evolution theory are discussed. Further, when comparing the KROSS TFRs to those at $z \approx 0$, we must consider the systematic bias introduced as a result of the measurement methods used. To make a direct comparison, it is essential to use the same observational and analytical methods. In practice, to compare to KROSS we must take IFU observations of $z \approx 0$ galaxies and degrade the data to the same signal-to-noise ratio, and spatial and spectral resolution, as that of the KROSS data. The degraded data must then be analysed in the same manner as with KROSS, at which point a direct comparison may be made. I discuss my work comparing the TFRs of KROSS and the SAMI Galaxy Survey in this manner, and its implications on previous measures of the evolution of the TFR since $z \approx 1$.