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Title:	THE SAMI GALAXY SURVEY: TOWARD A UNIFIED DYNAMICAL SCALING RELATION FOR GALAXIES OF ALL TYPES
Authors:	Mahajan, Smriti (/jspui/browse?type=author&value=Mahajan%2C+Smriti)
Keywords:	Dynamical Scaling Galaxies Sami Galaxy Survey
Issue Date:	2014
Publisher:	Institute of Physics (IOP)
Citation:	Astrophysical Journal Letters, 795(2)
Abstract:	We take advantage of the first data from the Sydney-AAO Multi-object Integral field Galaxy Survey to investigate the relation between the kinematics of gas and stars, and stellar mass in a comprehensive sample of nearby galaxies. We find that all 235 objects in our sample, regardless of their morphology, lie on a tight relation linking stellar mass (M *) to internal velocity quantified by the S 0.5 parameter, which combines the contribution of both dispersion (σ) and rotational velocity (V rot) to the dynamical support of a galaxy ($S_{0.5}=\sqrt{0.5\,V_{\rm rot}^{2}+\sigma ^{2}}$). Our results are independent of the baryonic component from which σ and V rot are estimated, as the S 0.5 of stars and gas agree remarkably well. This represents a significant improvement compared to the canonical M * versus V rot and M * versus σ relations. Not only is no sample pruning necessary, but also stellar and gas kinematics can be used simultaneously, as the effect of asymmetric drift is taken into account once V rot and σ are combined. Our findings illustrate how the combination of dispersion and rotational velocities for both gas and stars can provide us with a single dynamical scaling relation valid for galaxies of all morphologies across at least the stellar mass range 8.5 <log (M */M ⊙) < 11. Such relation appears to be more general and at least as tight as any other dynamical scaling relation, representing a unique tool for investigating the link between galaxy kinematics and baryonic content, and a less biased comparison with theoretical models.
Description:	Only IISERM authors are available in the record.
URI:	https://iopscience.iop.org/article/10.1088/2041-8205/795/2/L37 (https://iopscience.iop.org/article/10.1088/2041-8205/795/2/L37) http://hdl.handle.net/123456789/2790 (http://hdl.handle.net/123456789/2790)
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