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Dark matter and angular momentum in nearby disc galaxies

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Propositions

accompanying the dissertation

DARK MATTER AND ANGULAR MOMENTUM IN NEARBY DISC GALAXIES

1. The presence of outliers in galaxy scaling relations should not be overlooked. Upon careful inspection they may reveal the presence of interesting physical processes (This thesis).
2. Gas-rich ultra-diffuse galaxies shift off the baryonic Tully-Fisher relation and can have baryon fractions approaching the cosmological average (Chapters 2 & 3).
3. Some gas-rich ultra-diffuse galaxies appear to have dark matter haloes with extremely low concentrations (Chapters 2, 3, & 4).
4. The stellar, gas, and baryonic specific angular momentum–mass relations of disc galaxies are empirically well described by unbroken power laws (Chapter 5).
5. Disc galaxies define a tight plane in the baryonic mass–specific angular momentum–gas fraction space. Even outliers of other scaling laws follow this plane closely (Chapter 6).
6. The flaring of the gas discs has a negligible effect in the recovery of dark matter halo parameters from rotation curve decomposition, except for the smallest and most gas-rich dwarf galaxies (Chapter 7).
7. The dark matter halo concentration–mass relation predicted by N-body cosmological simulations is recovered in real galaxies with high-quality data. Deviations from the mean relation may inform us about the efficiency of processes like adiabatic contraction and feedback (Chapter 7).
8. The five countries with veto power in the United Nations Security Council are among the six largest weapon manufacturers in the world. The day this changes the world will likely be more safe from the business of war.
9. After decades of disastrous experiences like financing the coups to Salvador Allende and Evo Morales, the inhuman embargo against Cuba, and the traffic of weapons to Mexico, the government of the United States should stop its interventionism in Latin America and allow our communities to thrive.
10. In a fair university there should be no room for contract inequalities among pairs.
11. Having good communication and building an honest and fair relationship between PhD students and their supervisors is crucial for a successful PhD project.
12. Developing close friendships with people from different cultures and with different backgrounds is one of the most enriching and fulfilling experiences of living abroad.
13. ‘If you would be a real seeker after truth, it is necessary that at least once in your life you doubt, as far as possible, all things.’ René Descartes

Pavel E. Mancera Piña