INCLINATION AND GALAXY SIZES WITH ILLUSTRIS

Nikhil Arora, Stéphane Courteau

Department of Physics, Engineering Physics & Astronomy, Queen's University, Kingston, Canada

Introduction

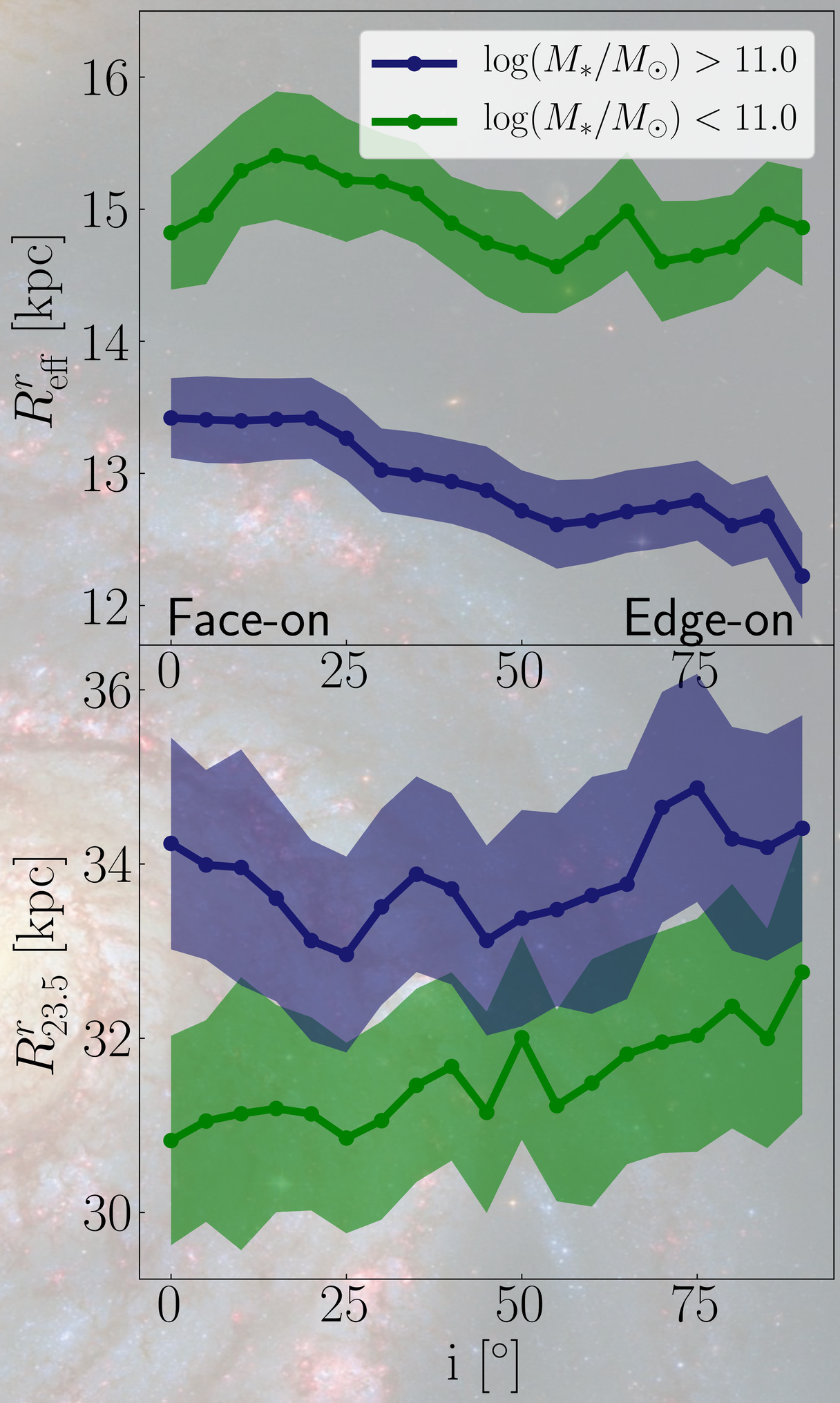
- Galaxy Sizes are a critical ingredient of most evolutionary scenarios.
- However, line of sight effects, including dust, can cause significant size variations and bias the interpretation of various galaxy properties and scaling relations.

Data & Method

- We study the variation of sizes as a function of inclination for Illustris galaxies. Mock SDSS *gri* images are created using SUNRISE for 95 simulated galaxies [1, 2]
- 19 images per galaxy are made at a constant azimuth and various inclinations.
- Stellar populations are invoked in an optically thin (no dust) medium.
- Surface photometry is performed on ~1700 images to derive sizes, brightness's and concentrations. These quantities are tested for their inclination dependence.

Results and Future

- Half light radii remain nearly constant for lower mass galaxies; however, they can decrease by ~6% for massive galaxies as a function of inclination (see top panel in figure).
- Isophotal radii, as expected, show an opposite trend: they increase with inclination for lower mass galaxies, and remain constant for more massive system.
- Even in a transparent case, radii fluctuations of ~10% can translate into ~25% uncertainties in the slope of common VRL scaling relations. [3]
- Adding dust attenuation (currently being investigated) considerably degrades the size measurement accuracy as well. [4]
- We are currently using zoom-in simulations (e.g. NIHAO) with various dust geometries to understand line-of-sight and radiation transfer effects on galaxy observables.



References:

1. Vogelsberger M. et al 2014, Nature, 509, 177
2. Jonsson P. 2006, MNRAS, 372, 2
3. Price S. et al 2017, ApJ Letters, 844, L6
4. Byun, Y.I. et al 1994, ApJ, 432, 114

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