Barolo Astroparticle Meeting

DEBATE

Scaling relations in small systems: CDM vs Modified Gravity

Aaron Dutton and Hongsheng Zhao
moderated by *Hannes Zechlin*

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Guests

- **Dr. Aaron Dutton**
  New York University Abu Dhabi, United Arab Emirates
  dutton@nyu.edu

  Well-known expert on galaxy formation and Dark Matter halos

- **Dr. Hongsheng Zhao**
  University of St. Andrews, UK
  hz4@st-andrews.ac.uk

  Long-standing expert on Dark Matter and Modified Gravity theories such as Modified Newtonian Dynamics (MOND)

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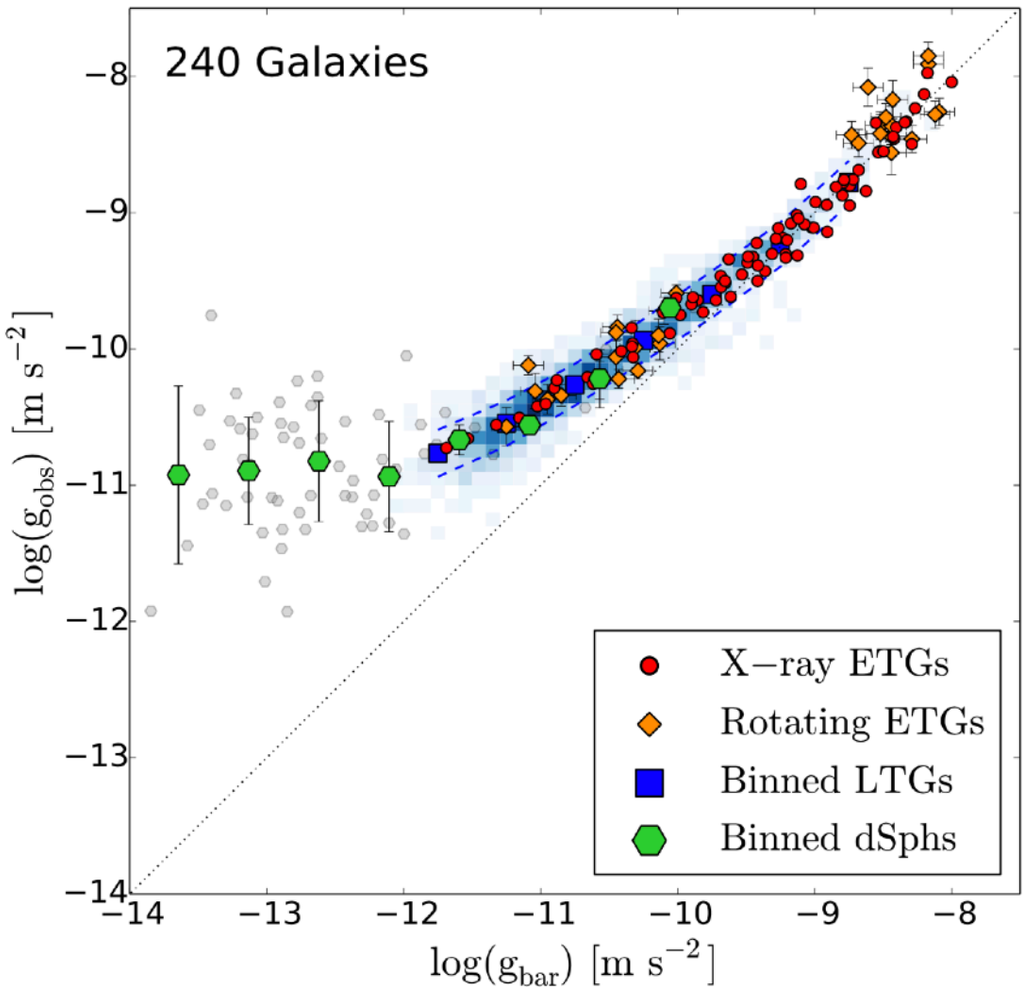
Kick off Topic: The Radial Acceleration Relation

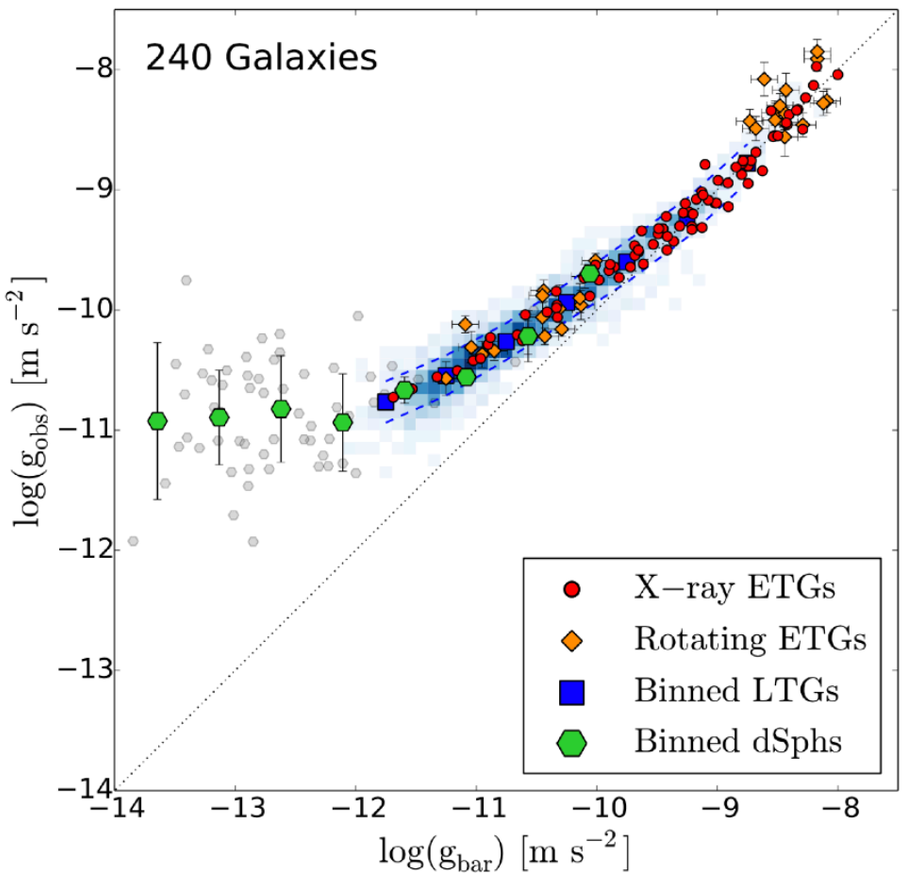
F. Lelli et al., 2017:
One Law to Rule Them All: The Radial Acceleration Relation of Galaxies



- 240 galaxies (LTGs, ETGs, dSphs): link between baryonic and DM content
- observed acceleration $g_{\rm obs}$ correlates with $g_{\rm bar}$ expected from baryons
- remarkably small scatter; residuals do not correlate with global or local galaxy properties
- possible flattening due to ultrafaint dSphs
- generalization of well-known dynamical galaxy relations, such as Tully-Fisher, etc.

Question 1)

Consider the figure below of Lelli et al. 2017.



What does it tell us? Does the flattening at low $g_{\rm bar}$ *support Dark Matter (DM) or Modified Gravity (MG)?*

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Question 2)

What is the observational relation that most strongly supports DM/MG at dwarf scales?

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Question 3)

What could be a final test to prove/disprove DM/MG at dwarf scales?