CHAPTER OVERVIEW

8: Dark Matter

Chapter 8 focuses on applying the law of gravity to the motions of astronomical systems to determine how much matter is present and how it is distributed. In the first half of the chapter, you will develop models of rotating systems for various velocity and mass distributions. Next you will explore the evidence for dark matter in galaxies and galaxy clusters by comparing the luminous mass and total gravitational mass. You will also explore models for what dark matter might be and why its nature remains so elusive.

Thumbnail: A NASA/ESA Hubble Space Telescope images of the MACS J0717.5+3745 galaxy cluster, which was observed in a study of how dark matter in clusters of galaxies behaves when the clusters collide. 72 large cluster collisions were studied in total. Using visible-light images from Hubble, the team was able to map the post-collision distribution of stars and also of the dark matter (colored in blue). (CC BY-4.0 Unported; NASA, ESA, D. Harvey (École Polytechnique Fédérale de Lausanne, Switzerland), R. Massey (Durham University, UK), the Hubble SM4 ERO Team, ST-ECF, ESO, D. Coe (STScI), J. Merten (Heidelberg/Bologna), HST Frontier Fields, Harald Ebeling (University of Hawaii at Manoa), Jean-Paul Kneib (LAM) and Johan Richard (Caltech, USA) via Wikipedia)
