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Brown Dwarf Binary Systems, The Coolest Pairs Around

DENISE STEPHENS, Brigham Young University

Brown Dwarfs are small substellar objects that are probably more of a dark red or magenta hue than brown. They span the temperature and mass range between the gas giant-planets and the lowest-mass stars, and are important for understanding the physics of both. We believe that brown dwarfs form like stars, but as they cool like a planet, different types of clouds will condense in their atmosphere and the dominant molecules will change. Their very existence provides clues as to how stars form, while their changing atmosphere reveals much about how a hot, young extrasolar planet will cool over billions of years. Of particular interest are the brown dwarf/brown dwarf binary systems. If we can determine the binary fraction of brown dwarfs, we can apply this fraction as a constraint on star formation models. The calculation of the orbital parameters of a brown dwarf binary system provides a direct measurement for the mass of the two objects, which when combined with their luminosity and temperature, can be used to constrain evolutionary models. This constraint is critical to understanding the atmospheres of directly imaged hot, young extrasolar planets whose temperatures are the same as the brown dwarfs we study. In this talk I will review the characteristics of brown dwarfs, why we are interested in the discovery and characterization of binary systems, and what we are doing with HST data to try and detect and characterize marginally resolved brown dwarf binary systems.