Gaps in Protoplanetary Disks as Probes of Planet Formation  

Prof. Hannah Jang-Condell  
University of Wyoming

ABSTRACT:

Over 1000 exoplanets have been discovered to date. The vast majority of these have orbital parameters entirely unlike our Solar System. The question of how these planetary systems arise must be studied in the context of how planets interact with the circumstellar disks from which they form. Planet-disk interactions not only affect the growth and composition of planets, but also alter the orbital dynamics of embryonic planets. Directly studying protoplanetary disks is a promising way to understand the growth and development of planets.

Sufficiently massive planets can open annular gaps in the disk along their orbital paths, producing observable signatures of active planet formation in disks. I will discuss consequences for the formation of planets embedded in these gaps as well as the observable features of these gaps. Current instrumentation is already able to detect Neptune-mass planets embedded in known protoplanetary disks. Comparison of theoretical models of gap shadowing to observations of real disks puts important constraints on where, when, and how planets form.