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Institution: Canadian Institute for Theoretical Astrophysics
Title: Using evaporation to understand exoplanet properties
Type: Contributed Talk
Session: Characterizing Transiting Planets
Abstract: Due to the composition degeneracies that exist for low-mass planets, particularly when only planet radius measurements are available we must appeal to evolutionary models of planets to help break the degeneracies. I will demonstrate how evolutionary models of planets that include evaporation can help to make inferences about planet structure. I will discuss the importance of evaporation, which becomes important at small (<0.2 AU) separations and can sculpt the evolution of low-mass Hydrogen/Helium rich planets.

I will emphasize the importance of using evaporation rates calculated hydrodynamically and self-consistently, which exist in either X-ray driven or EUV driven modes. These evaporation rates can be compared to the simpler and more commonly used 'energy-limited' model and I will show that an evolving evaporating planet does not follow an evolution of constant evaporation efficiency, and how this can lead to gaps in the planet radius distribution. Finally, I will show that the evaporation of a planet during its evolution is particularly sensitive to the mass of any solid core, allowing us to make inferences about the composition of transiting planets.