SACRAMENTO STATE

Department of Physics and Astronomy

SPRING 2023 Colloquium Series

"Exoplanet Model Atmospheres for JWST Spectroscopy"

Anna Gagnebin

Sac State Physics Major Senior Project Research

With the recent launch of the James Webb Space Telescope (JWST), our ability to analyze planetary atmospheres has been revolutionized. In Cycle 1, JWST will be taking spectra for over 70 different transiting planets at a variety of sizes and temperatures, in transit and at secondary eclipse. With all of this JWST data, there needs to be a way to readily assess the initial atmospheric characteristics. In order to simplify the process of knowledge extraction and initial comparison to models, I have been working to create a variety of atmosphere models and spectra for each of the exoplanets that are set to be observed in cycle 1. For each planet I use the Planetary Intensity Code for Atmospheric Spectroscopy Observations (PICASO) code, an open-source 1D python model, to create a mini-grid of model atmospheres and spectra. I examine the role of changing metallicity, C/O ratio, heat redistribution, and other factors on the atmospheres. These simulations will serve as an important baseline, both for the initial comparison to JWST spectra and as a starting point to more detailed models, which may include non-equilibrium chemistry or dynamics. These models will be posted online as a community resource for comparison to JWST data.

Thursday, May 4, 2023

4:00 - 5:20PM

MND1015

Open & Free to all students, faculty and public