



Department of Physics and Astronomy
FALL 2026 Colloquium Series

Summer Research Experience

Sac State Physics and Astronomy Majors

Commissioning and Testing of the MOPS Hub for the ATLAS ITk Pixel

- Jessica Misukanis

Monitoring of Pixel Systems (MOPS) is an on-detector, radiation-hard monitoring chip for the Inner Tracker (ITk) Pixel Detector at the center of the upgraded ATLAS detector at point 1 of the Large Hadron Collider. With over 1000 chips needed on-detector to readout voltages and temperatures of pixel modules, the information from each chip will pass through a MOPS Hub which aggregates the information and serves it to the Detector Control Systems (DCS). The second iteration of the MOPS Hub was recently installed and required extensive testing in order to commission it for ITk Demonstrator testing during Long Shutdown 3 (LS3) which began in July 2026. Rigorous testing of the MOPS Hub powering and communication systems both to the MOPS and with the DCS was performed which included both reading and debugging hardware measurements as well as prototyping the software used for readout and display of the measured values. Although several errors, such as rapid fluctuations between “alive” and “not alive” are not well understood yet, the system has been installed and tested for use in demonstrator testing in ATLAS.

Here they Come Screaming Across the Sky, it's Lots and Lots of Jets in Plane!

- Jaspreet Singh

Relativistic jets in high energy astrophysics remain a topic of relative mystery. General relativistic magnetohydrodynamics simulations paired with the relevant general relativity models show us that there are more to these cosmic drills via the radio spectrum. The surrounding environments enveloping these jets play a key role in shaping how each individual jet will turn out. I will explore the background to these phenomena and present a small sample of visualizations I have either analyzed or tried to replicate as a scientific exercise to prepare for a more fleshed out senior project releasing later this year.

Detrital Zircon U-Pb Geochronology

- Jordan Codde

I will describe how detrital-zircon U–Pb geochronology can be used to investigate the age and sediment sources of fossil-footprint-bearing sandstone at the Old Nevada State Prison in Carson City. Sandstone samples collected in the Carson City area were processed to separate zircon grains, which were then analyzed by LA-ICP-MS at the Arizona LaserChron Center. The samples are dominated by Cretaceous zircon populations, while younger zircons in some samples provide maximum depositional-age constraints of 4.76 ± 0.08 Ma and 1.50 ± 0.05 Ma. These findings help establish the depositional history of the fossil-bearing sandstone and disprove a footprint interpretation originally popularized by Samuel Clemens.

Thursday, Sept. 10, 2026

4:00 - 5:20PM

MND1015

Open & Free to all students, faculty and public