Plasma Physics Seminar

Physics & Astronomy Building (PAB) Room 4-330
Via Zoom: https://ucla.zoom.us/s/96507503189
Friday April 18th at 12:30 PM
Lunch will be served at 12:00 PM

Searching for dark matter with plasma astrophysics

Elizabeth Tolman (Flatiron Institute)

One of the most compelling candidates for dark matter is a hypothetical particle called the axion. If axions exist, they would slightly modify Maxwell's equations. This modification would alter the electromagnetic emission produced in highly magnetized plasmas, including those found in the magnetospheres of pulsars (rapidly rotating, magnetized neutron stars). To search for axions using pulsars, it is crucial to understand both standard pulsar emission mechanisms and how axions might alter them. In this talk, I will present recent work that uses techniques common in laboratory plasma physics, but unfamiliar in astrophysics, to study relativistic, quantum electrodynamic discharges occurring in pulsar magnetospheres. This work provides potential explanations for the pulsar radio luminosity and spectrum, which have remained mysterious since the discovery of pulsars in the 1960s, and contributes to axion searches. Future research will use laboratory plasma techniques to identify specific signatures that axions might produce in pulsar emission and to search astronomical data for these signatures.