

Plasma Physics Seminar

Physics & Astronomy Building (PAB) Room 3-330

Via Zoom: <https://ucla.zoom.us/j/92785449357?pwd=SVBTSko3bTdEUW03dzQwNks1Q2IKZz09>

Friday, November 17, 2023 at 12:30PM

Lunch will be served at 12:00PM

Frequency-Resolved Local Measurements of Phase-space Energization Applied to MMS Observations

Emily Lichko (University of Chicago)



Abstract: In order to disentangle the competing kinetic-scale energy dissipation processes that are intrinsic to space and astrophysical plasmas it is critical to be able to diagnose the energy transfer that is occurring locally in both time and space. A relatively recent technique to resolve the local rate of energy transfer between the fields and particles is the field-particle correlation (Klein & Howes APJL 2016), which has resolved local energy transfer at a single point in space for a large variety of systems and physical processes. This work details an updated version of the field-particle correlation that includes for the first time a breakdown of the energy transfer in frequency space, as well as time and velocity space. In addition to the increase in available information, this new method more cleanly separates magnitude and phase information of the signal, resulting in an improvement of the temporal resolution. This new method is applied to Gkeyll simulations of electron Landau damping as a proof of concept, as well as Magnetospheric MultiScale (MMS) observations of solar wind turbulence.