BOSTON UNIVERSITY

Boston University College of Arts & Sciences
Center for Space Physics

2021—2022 SPACE PHYSICS SEMINAR SERIES

Thermal Energy Creation and Transport in Solar Eruptions

We examine the heating processes at play in solar eruptions, both through the observational analysis of imaging data of solar eruptions, and through MHD simulations. Observationally, we measure temperatures and velocity fields in the region above flare arcades using high cadence AIA data, and find sustained heating and correlations between converging velocities and areas of heating. These results indicate that adiabatic heating is an important effect in the local heating of the supra-arcade plasma sheet. For the simulations, we model CMEs a numerical MHD code that includes coronal heating, thermal conduction and radiative cooling in the energy equation. We examine the quantities responsible for plasma heating and cooling during the eruption, including thermal conduction, radiation, adiabatic compression and expansion, coronal heating, and ohmic heating due to dissipation of currents. Similar to our observational results, we find that the adiabatic compression plays an important role in heating the plasma around the current sheet, especially in the later stages of the eruption. Thermal conduction also plays an important role in the transport of thermal energy away from the current sheet region throughout the reconnection process.

Thursday, November 4th

4:00-5:00 p.m.

725 Commonwealth Ave | Room 502

Katharine Reeves

Harvard University