BOSTON UNIVERSITY

Boston University College of Arts & Sciences Center for Space Physics

2021—2022 SPACE PHYSICS SEMINAR SERIES

Investigating the Thermodynamic Evolution of Coronal Mass Ejections by Merging Remote and In Situ Observations with Nonequilibrium Ionization Modeling

Coronal mass ejections are large scale eruptions that are quickly heated and accelerated from the Sun. The energy deposition is reflected by in situ measurements of highly ionized heavy ions measured in the ejecta. However, there is still much uncertainty surrounding the processes supplying the energy to power the eruption. To provide insight to the rapid thermodynamic evolution during the eruption, we have simulated the ionization and recombination experienced by C, O, Fe ions within the ejecta using nonequilibrium ionization (NEI) modeling. Through this study, we find that CMEs experience rapid, continuous, and non-uniform heating as they travel away from the eruption site. Additionally, the result strongly suggests that to fully capture the heating experienced by the highly multi-thermal CME structure, it is critical to constrain the NEI simulations by remote and in situ observations. This has become more feasible with solar missions like Parker Solar Probe and Solar Orbiter which will facilitate studies merging remote and in situ observations through multi-perspectives views of the Sun.

Thursday, October 7th

4:00-5:00 p.m.

725 Commonwealth Ave | Room 502

Yeimy Rivera

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