Contribution ID: **61** Type: **Talk**

Toward resolving the nonthermal motions in the solar corona

Tuesday, February 28, 2023 2:10 PM (13 minutes)

The MUSE instrument will provide information on intensity and flows in the corona with unprecedented spatial and temporal resolutions. High-resolution 3D MHD models of coronal loops are thus timely and crucial to investigate the connection between heating events and resulting spectral diagnostics.
We carried out high-resolution simulations of a straightened coronal loop that is self-consistently heated and sustained by magnetoconvection. From the model, we synthesized spectral profiles in temperature ranges of 2–3 MK that the MUSE instrument could observe.
The resulting nonthermal linewidths are compatible with the observed values. Due to the high spatial resolution, our simulations partially resolved the energy cascade to small scales within the loop interior. A significant part of the injected Poynting flux is associated with flows on short timescales and small spatial scales, such as vortices propagating from the photosphere to the corona. Our model allows us to disentangle the contribution of motions perpendicular to the axial field of the loop and evaporative upflows that occur in response to coronal heating events.
In this talk, I will discuss the response of the coronal emission line profiles to energy injection and release and whether signatures of propagating vortices could be observed with MUSE.

Primary author: BREU, Cosima Alexandra (School of Mathematics and Statistics, University of St. Andrews)

Co-authors: PRZYBYLSKI, Damien (Max Planck Institute for Solar System Research); Prof. PETER, Hardi (Max Planck Institute for Solar System Research); Prof. DE MOORTEL, Ineke (School of Mathematics and Statistics, University of St. Andrews); CHITTA, Lakshmi Pradeep (Max Planck Institute for Solar System Research); CAMERON, Robert (Max Planck Institute for Solar System Research); SOLANKI, Sami (Max Planck Institute for Solar System Research)

Presenter: BREU, Cosima Alexandra (School of Mathematics and Statistics, University of St. Andrews)

Session Classification: Corona

Track Classification: Corona