Contribution ID: **48**　　Type: **Poster**

Solar Flare Ribbon Fronts: Constraining flare energy deposition with IRIS spectroscopy

Lower atmospheric lines show peculiar profiles at the leading edge of ribbons during flares. In particular, increased absorption of the BBSO/GST HeI 10830 A line (e.g. Xu2016), as well as broad and centrally reversed profiles in the MgII and CII spectra observed by the IRIS satellite (e.g. Panos2018) have been reported. In this work, we aim to understand the physical origin of the IRIS ribbon front line profiles, which seem to be common of many, if not all, flares. To achieve this, we quantify the spectral properties of the IRIS MgII ribbon front profiles during four large flares and perform a detailed comparison with a grid of radiative hydrodynamic models using the RADYN code. We also studied their transition region counterparts, finding that these ribbon front locations are regions where transition region emission and chromospheric evaporation are considerably weaker compared to other parts of the ribbons. Based on our comparison between the IRIS observations and modelling, our interpretation is that there are different heating regimes at play in the leading and trailing regions of the ribbons. More specifically, we suggest that bombardment of the chromosphere by more gradual and modest non-thermal electron energy fluxes can qualitatively explain the IRIS observations at the ribbon front, while stronger and more impulsive energy fluxes are required to drive chromospheric evaporation and more intense TR emission. Our results provide a possible physical origin for the peculiar behavior of the IRIS chromospheric lines in the ribbon leading edge and new constraints for the flare models.

Primary author: POLITO, Vanessa (BAERI/LMSAL)

Co-authors: KERR, Graham (NASA/GSFC); Dr XU, Yan (NJIT)

Presenter: POLITO, Vanessa (BAERI/LMSAL)

Session Classification: Posters

Track Classification: Flares and Eruptions