Contribution ID: **45** Type: **Poster**

Radiative losses above a quiet-Sun region

The heating of the outer layers of the solar atmosphere is still far from being completely understood. In this sense, in the last few years we have witnessed a huge step forward in our understanding from both a theoretical and an observational perspective. This has been possible due to the inclusion of new physics in the former and the deployment of new observing facilities that has opened unprecedented technical capabilities required for the study of these highly dynamic layers. As a major result, it has been found that understanding the heating problem involves a coupled system (the solar atmosphere), thus requiring its study as a whole system.

One important missing piece in this context is the capability to observationally constrain the various physical mechanisms that heat the outer layers in the numerical simulations. In this contribution we present the application of a newly-developed inversion algorithm that expands the capabilities of the NLTE inversion code STiC to better handle inversions combining multi-resolution observations. This is of utmost importance for the chromosphere and above as their intrinsic highly stratified nature makes it mandatory to combine observations from different observing facilities with disparate optical behaviours. In particular, we combine observations of a quiet-Sun area co-observed with the SST (CRISP and CHROMIS) and IRIS. By the inference of the various physical properties of the atmosphere we compute the radiative losses from different sources and discuss their potential physical origin.

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Session Classification: Posters

Track Classification: Chromosphere