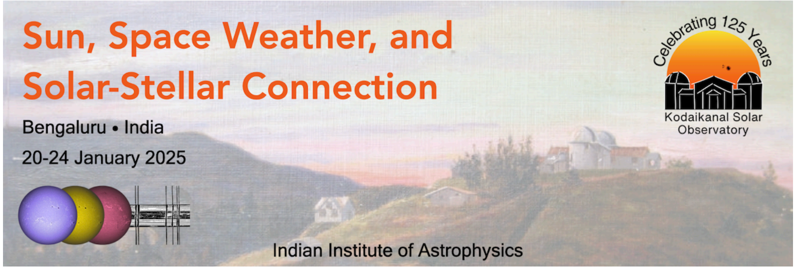

Contribution ID: **55** Type: **Poster**

On the million-degree signature of spicules

Spicules have often been proposed as substantial contributors toward the mass and energy balance of the solar corona. While their transition region (TR) counterpart has unequivocally been established over the past decade or so, the observations concerning the coronal contribution of spicules have often been contested. This is mainly attributed to the lack of adequate coordinated observations, their small spatial scales, their highly dynamic nature, and complex multi-thermal evolution, which are often observed at the limit of our current observational facilities. Therefore, it remains unclear how much spicular plasma is heated to coronal temperatures. In this study, we use coordinated high-resolution observations of the solar chromosphere, TR, and corona of a quiet-sun network region with the Interface Region Imaging Spectrograph (IRIS) and the Atmospheric Imaging Assembly (AIA) to investigate the (lower) coronal (~1MK) emission associated with spicules. We perform differential emission measure (DEM) analysis on the AIA passbands using the basis pursuit and a newly developed technique based on Tikhonov regularization to probe the thermal structure of the spicular environment at coronal temperatures for the first time. We find that the EM maps at 1 MK reveal the presence of ubiquitous, small-scale jets with a clear spatio-temporal coherence with the spicules observed in the IRIS/TR passband. Detailed space-time analysis of the chromospheric, TR, and EM maps show unambiguous evidence of rapidly outward propagating spicules with strong emission (2—3 times higher than the background) at 1MK. Our findings are consistent with existing MHD simulation that shows heating to coronal temperatures associated with spicules.

Contribution Type

Poster

Theme

Solar Magnetism in High-Resolution

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