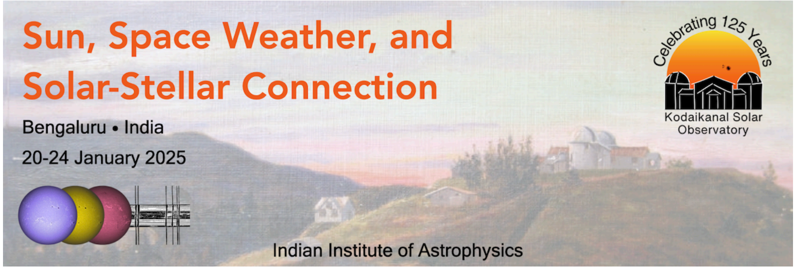

Contribution ID: **54**   Type: **Contributed talk**

Chromospheric and Coronal Heating in Active Regions: A Joint Perspective from Observations and Numerical Simulations

Tuesday, January 21, 2025 12:25 PM (15 minutes)

The question of what heats the outer solar atmosphere remains one of the longstanding mysteries in astrophysics. Statistical studies of Sun-like stars reveal a correlation between global chromospheric and coronal emissions, constraining theoretical models of potential heating mechanisms. However, spatially resolved observations of the Sun have surprisingly failed to show a similar correlation on small spatial scales. Here we use unique coordinated observations of the chromosphere (from the IRIS satellite) and the low corona (from the Hi-C 2.1 sounding rocket), and machine-learning-based inversion techniques, to show a strong correlation on spatial scales of a few hundred kilometers between heating in the chromosphere and emission in the upper transition region in strong magnetic field regions ('plage'). Furthermore, we follow up on this study with coordinated SST and Solar Orbiter observations that further constrain the observed heating patterns. Our observations are compatible with an advanced three-dimensional magnetohydrodynamic simulation in which the dissipation of current sheets caused by magnetic field braiding is responsible for heating the plasma simultaneously to chromospheric and coronal temperatures. Our results provide deep insight into the nature of the heating mechanism in solar active regions.

Contribution Type

Theme

Solar Magnetism in High-Resolution

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