

Solar Origins of Irradiance Variations

Team Members:

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Productivity:

23 publications

2 NASA press releases

1 radio interview

1 press conference

<http://solar.physics.montana.edu/irradiance/>

Goals (from the NRA):

- Understand the physical processes underlying the solar spectral irradiance (e.g., plasma heating).
- Determine how the SSI depends on key physical parameters (e.g., magnetic field strength and flux).
- Construct physics-based models of active regions.

Successes

- Used X-ray observations from Hinode to discover hot (~ 10 MK) plasma expected from coronal nanoflares.
- Constructed physics-based models of active regions and the global Sun (corona and transition region) using both impulsive and steady heating.
- Constructed semi-empirical models of the chromosphere and trans. region that match the observed non-LTE irradiance spectrum.
- Determined the relationship between SSI and total unsigned magnetic flux, including a temporal delay component.
- Discovered that TSI and probably SSI depend on sunspot type, not simply area.
- Calibrated MDI magnetogram zero point and E/W asymmetry.
- Showed that coronal loops can be explained by storms of nanoflares but not thermal nonequilibrium.
- Integrated coronal and chromospheric models (in progress).

