

Solar Origins of Irradiance Variations
Team Meeting
Boulder, January 25-26, 2010

Participants:

James Klimchuk
Roberto Lionello
Juan Fontenla
Dora Preminger
Piet Martens
Margit Haberreiter

We had a productive meeting discussing progress to date and plans for the future (although the program is formally coming to a close). Four areas were deemed especially promising and will be pursued.

1. Models of the lower atmosphere (chromosphere and lower transition region) and upper atmosphere (upper transition region and corona) are coupled by matching the pressure and temperature gradient at a common temperature, typically 0.2 MK. For static models, this can be accomplished most easily using analytical solutions for the upper atmosphere. Piet Martens and Juan Fontenla will work together to build static chromosphere-through-corona models.
2. Jim Klimchuk and Roberto Lionello will continue their comparative study of coronal loops undergoing thermal nonequilibrium. They will examine whether and how it is possible to obtain extended regions of cold plasma, as some MHD simulations seem to indicate. They will give special care to the lower boundary conditions and consider heating functions that depend strongly on the local magnetic field strength.
3. Juan Fontenla will provide guidance to Roberto Lionello and Jim Klimchuk to help them modify their loop hydro codes to account for the energy required to ionize hydrogen. This involves modification of the heat flux and radiative loss function below 50,000 K. They will examine how the results depend on this new physics.
4. Dora Preminger, Jim Klimchuk, Dibyendu Nandi, and Piet Martens will study how the soft X-ray luminosity of active regions depends on electric current density, especially at small spatial scales relevant to field line tangling thought to be important in coronal heating. Since these scales are below the resolving power of present-day instruments, trends and extrapolations will be used.