

3. Magnetic coupling and mass flux through the atmosphere

Spectral evolution along a flux loop observed with IRIS

Leping Li¹, Hardi Peter², Limei Yan³ and Jun Zhang¹

¹ *CAS Key Laboratory of Solar Activity, National Astronomical Observatories, Chinese Academy of Sciences, Beijing 100101, China*

² *Max Planck Institute for Solar System Research, 37077 Göttingen, Germany*

³ *Key Laboratory of Earth and Planetary Physics, Institute of Geology and Geophysics, Chinese Academy of Sciences, Beijing 100029, China*

Using far ultraviolet (UV) spectra and slit-jaw images from IRIS, we studied an emerging active region loop, connecting two plage-type faculae with opposite polarities, scanned by the IRIS raster. Single Gaussian (SG) fit is employed to the line core of the Si IV (1394 Å) line, and the residual of the observed line profiles to the SG is obtained. Several parameters about the line profiles are measured to indicate the evolution and distribution of the emission line along the loop. A proper motion just before the IRIS raster scanning is observed along the loop, indicating that the slit scanned the moving plasma parcel. The Doppler shift map shows blueshift in the east, and redshift in the west, consistent with a siphon flow along the loop. Spectral tilts are detected along the loop, meaning the inside twisting motions. The enhancements in the blue and red wings, and their distribution and evolution along the loop, are observed. These, also, lead to the evolution of the RBA of the transition region line along the loop. The enhanced emission in the blue wing near the eastern footpoint indicates an injection at this footpoint. The proper motion along the loop and the Doppler shift support that the loop is a flat one. The twisting motions of the plasma parcel may cause the evolution and distribution of the enhancements of the line wings and the RBA.