

3. Magnetic coupling and mass flux through the atmosphere

**Magnetic loops in a flux-emerging region viewed by IRIS, Hinode  
and SDO**

Zhenghua Huang<sup>1</sup> (z.huang@sdu.edu.cn), Lidong Xia<sup>1</sup> (xld@sdu.edu.cn)

<sup>1</sup>*Shandong Provincial Key Laboratory of Optical Astronomy and Solar-Terrestrial Environment, Institute of Space Sciences, Shandong University, Weihai, 264209 Shandong, China*

Magnetic loops are one of the fundamental structures of the solar atmosphere. Due to their high contrast to the background emission, they are the perfect objects to investigate how magnetic field and energy are transported into the higher solar atmosphere. Using coordinated observations from IRIS, Hinode and SDO, here we study a set of magnetic loops in a flux-emerging region. While the high resolution data from IRIS reveal fine threads of the loops, the XRT and AIA images also show clear response. The electron density measured with EIS Fe XII  $\lambda\lambda 186.8/195.1$  show significant unbalance with  $\sim 10^{10} \text{ cm}^{-3}$  at one footpoint and  $\sim 2.5 \times 10^9 \text{ cm}^{-3}$  at the other. The Si IV spectra of these loops show clear blue shifts in the loop top with order of 10 km/s, while the hotter lines observed in EIS present red shifts. The temperature distribution of the region will be also investigated using DEM method with EIS spectral data. The imaging and IRIS spectral data reveal clear activities in the loops with signatures of UV bursts. These UV bursts are likely energetic events associated with interactions between emerging flux and pre-existing flux. These observations should improve our understanding to the process of flux emergences and their responses in the upper solar atmosphere.