Solar Flare Observations with EIS

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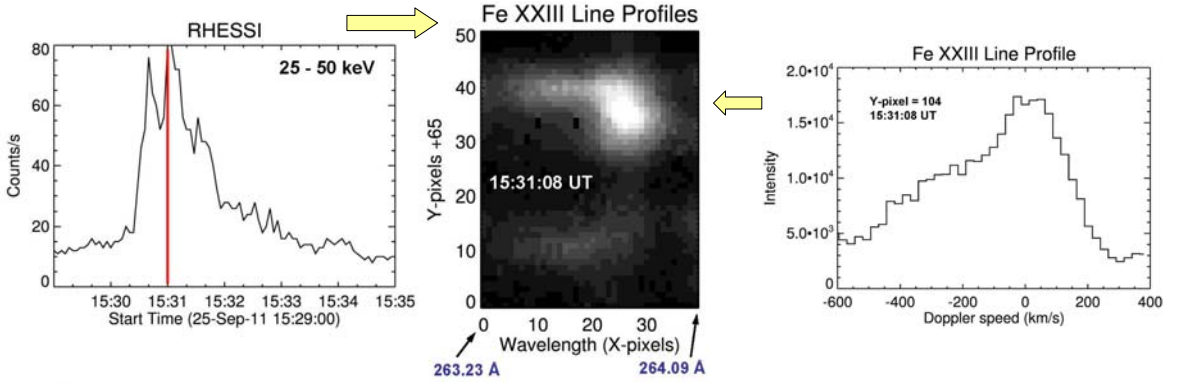
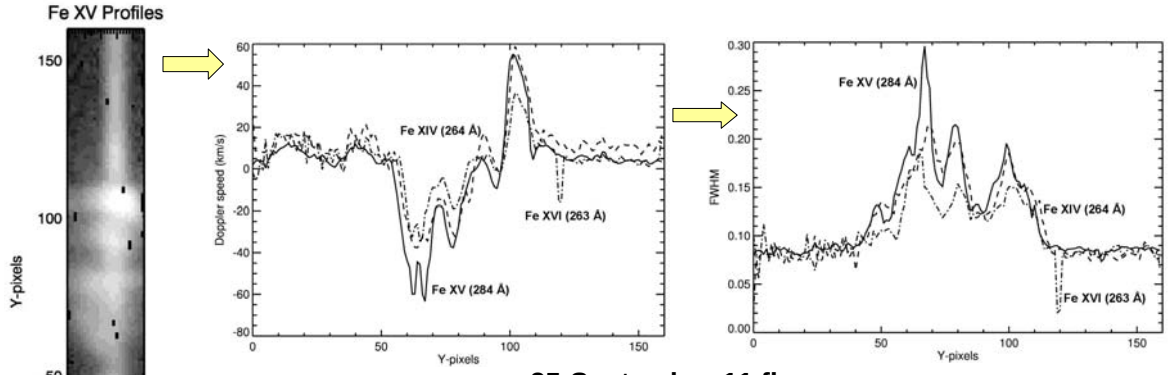
Hinode-7, The Seventh Hinode Science Meeting
Takayama, Japan, 12-15 November 2013

The EIS imaging spectrometer on Hinode can isolate flare footpoint regions, and with RHESSI can test models of chromospheric evaporation where evaporation is produced by high energy electron precipitation in the chromosphere. Examples of observations and results that can be obtained by EIS are given in this poster. EIS has observed flare footpoints in many spectral lines using several types of EIS flare studies.

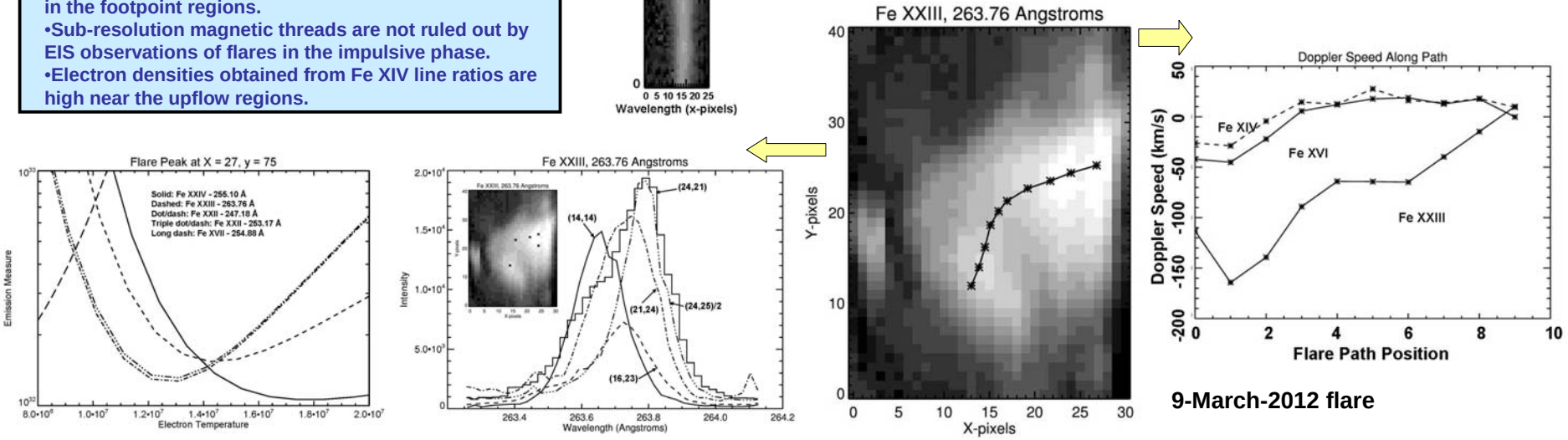
•Conclusions

- •Multi-million degree degree upflows are seen in Fe XXIII & Fe XXIV lines at the footpoints with speeds up to 600 km/s. Sometimes the entire line profiles are shifted and Gaussian in shape, although sometimes a stationary (unshifted) component is also seen with the upflow component.
- •Upflows at coronal temperatures are much less, usually < 60 km/s, and sometimes downflows are seen in coronal lines.
- •Line profiles at all temperatures can be quite complicated at flare footpoints.
- •The temperature dependence of evaporation is in general agreement with models, although there are exceptions for particular events.
- •Temperatures at the loop tops are about 12 MK.
- •Non-thermal motions and/or turbulence are increased in the footpoint regions.
- •Sub-resolution magnetic threads are not ruled out by EIS observations of flares in the impulsive phase.
- •Electron densities obtained from Fe XIV line ratios are high near the upflow regions.





25-September-11 flare



9-March-2012 flare

9-March-2012 flare