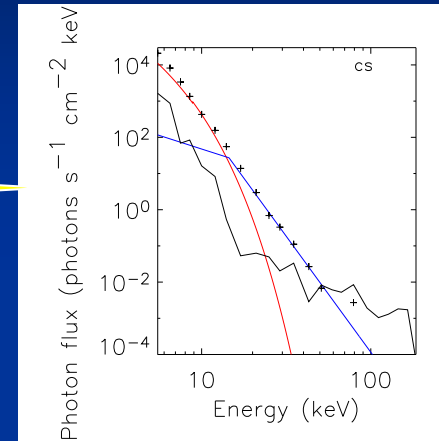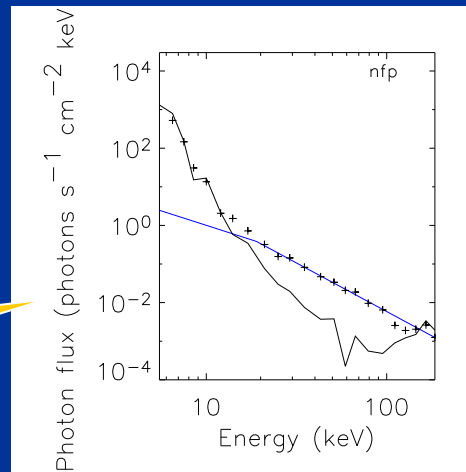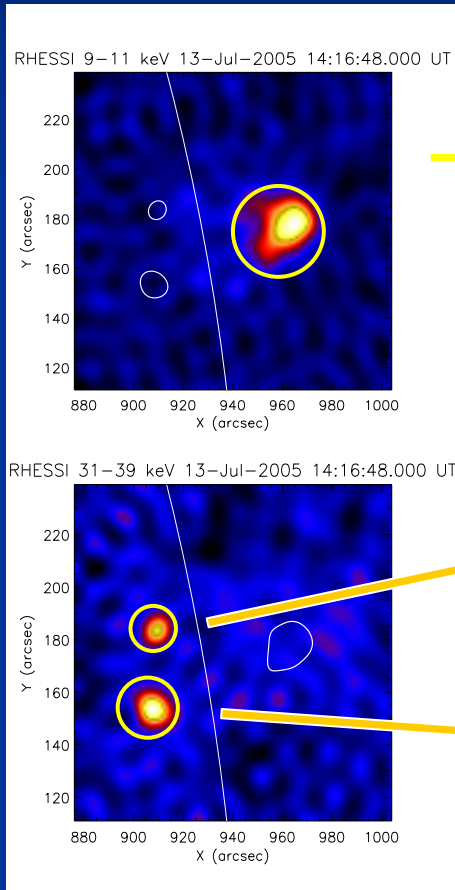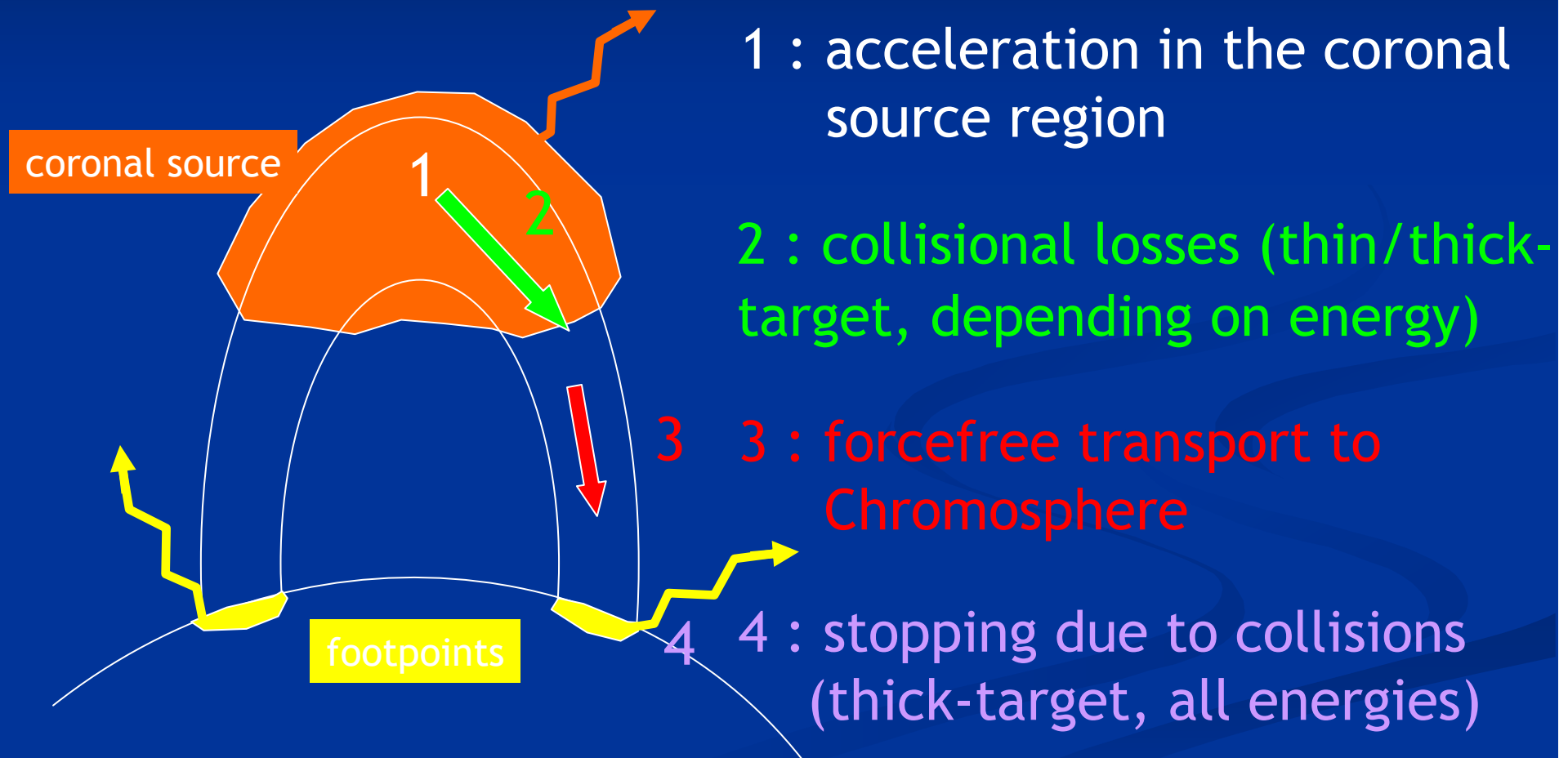# Particle acceleration and propagation in solar flares

Marina Battaglia

ETH Zurich

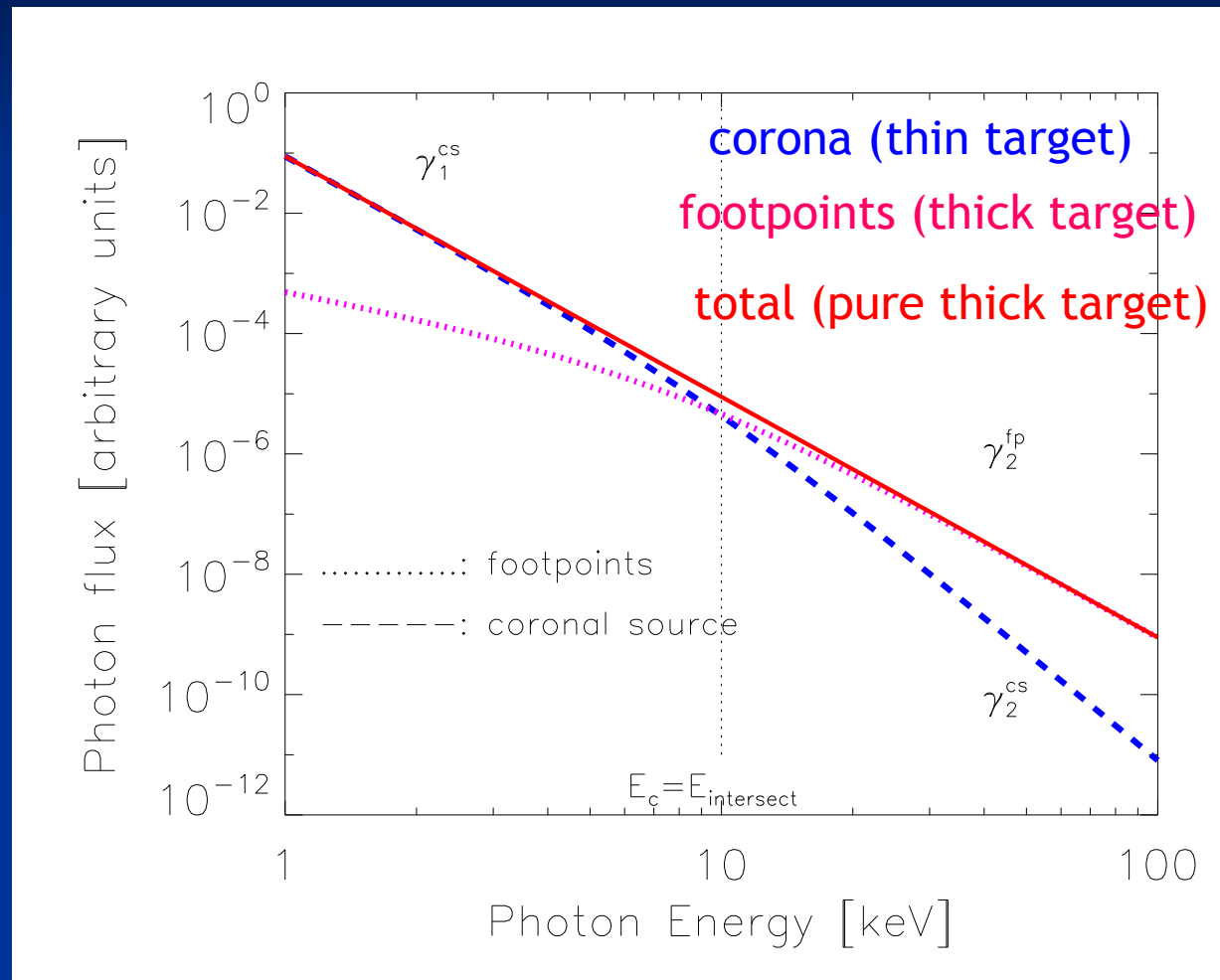# What we observe with RHESSI
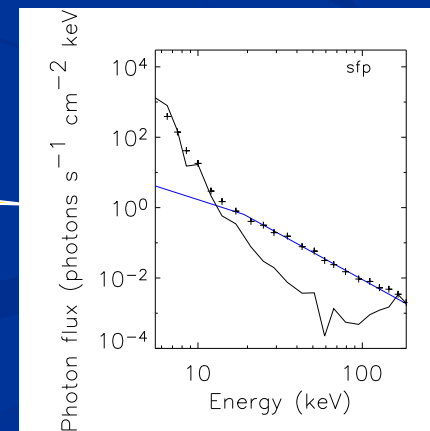
The common picture

1 : acceleration in the coronal source region

2 : collisional losses (thin/thick-target, depending on energy)
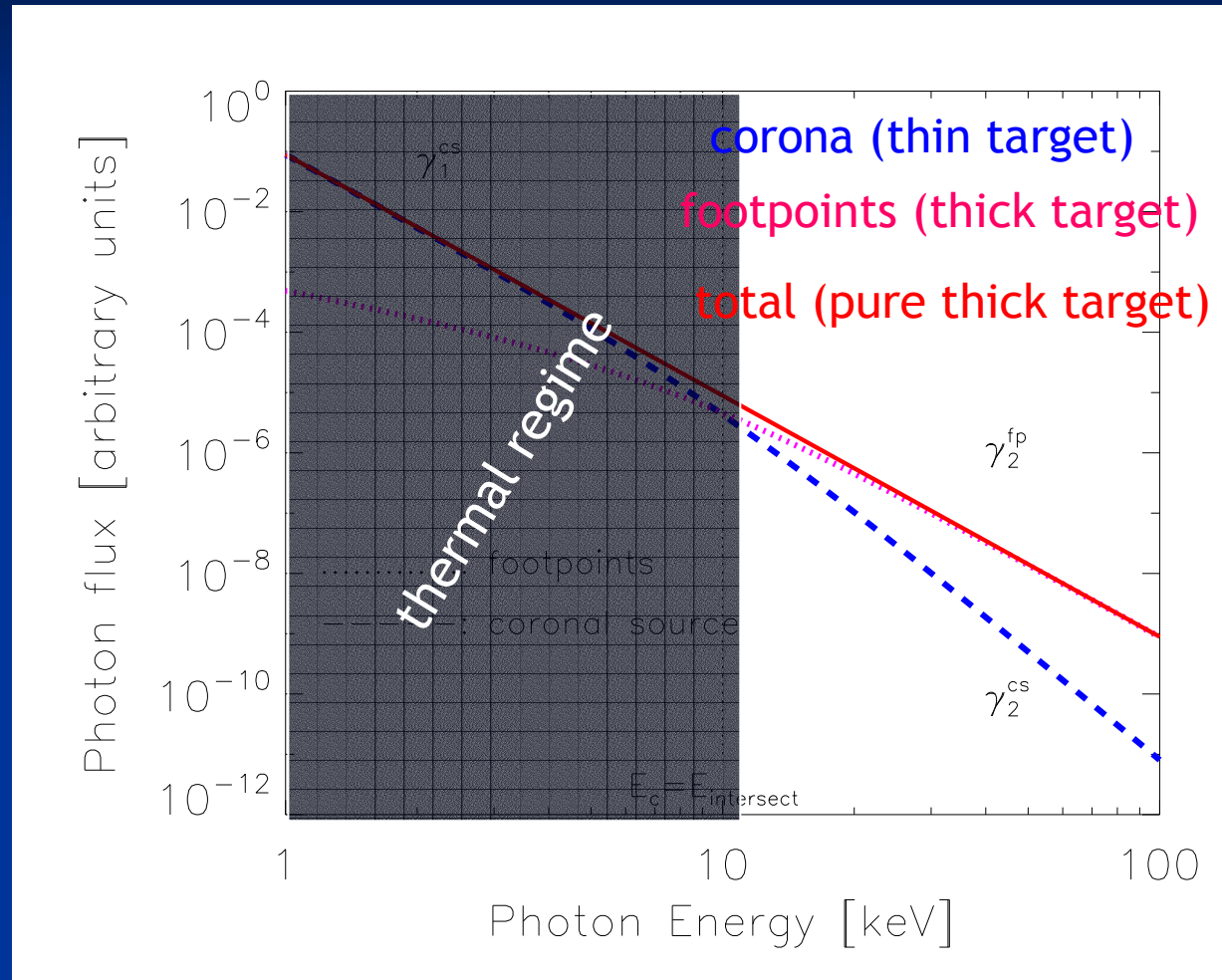
3 : forcefree transport to Chromosphere

4 : stopping due to collisions (thick-target, all energies)

coronal source

footpoints

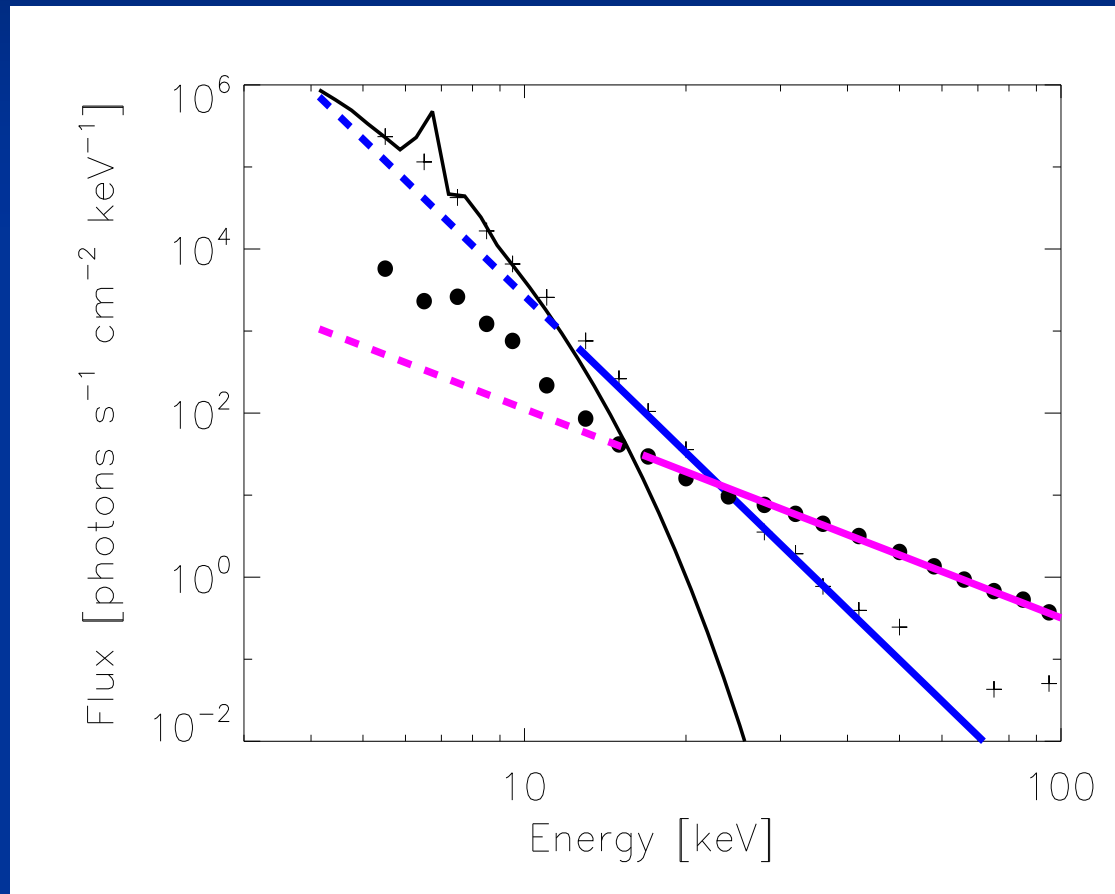# Expected footpoint and coronal photon spectra

Wheatland & Melrose, 1995

Expected footpoint and coronal photon spectra

Difference in spectral index = 2

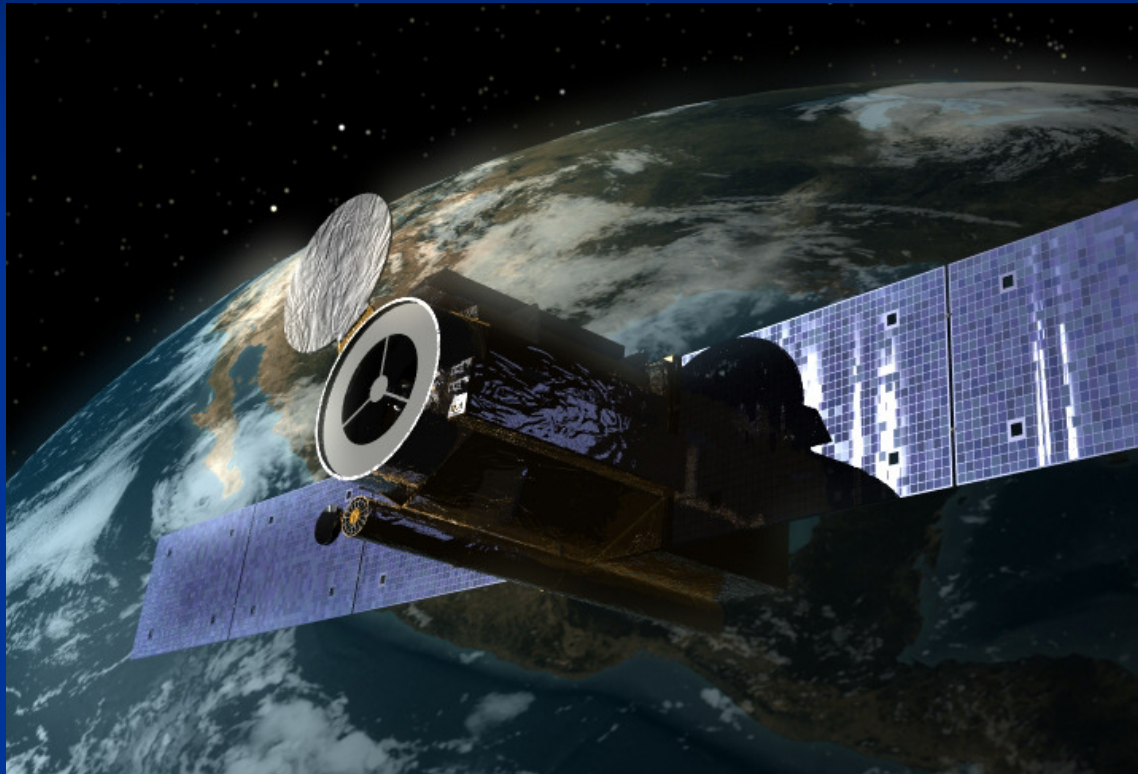# Observed footpoint and coronal photon spectra

Difference in spectral index ≥ 2

What to do?

- Explore transport effects in the loop
  - electric field
  - collisional effects
  - ?

- Investigate physics in coronal source
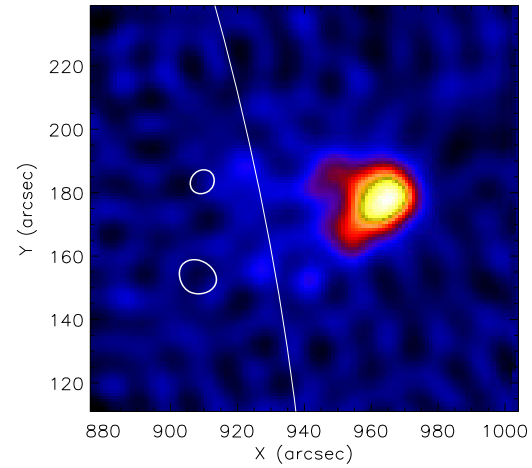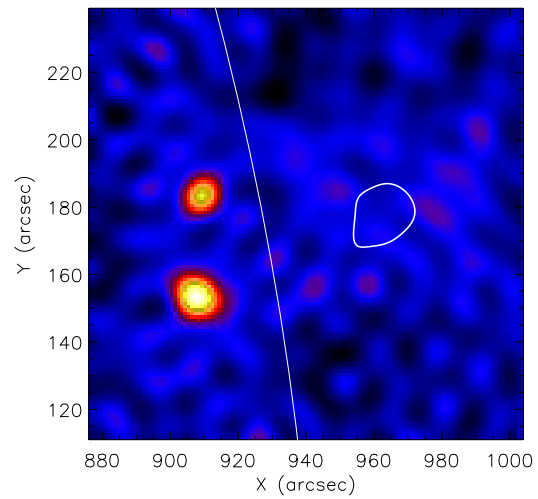
Where Hinode comes into play

For accurate development of models need

- Information on Loop structure
- Loop temperature and density distribution
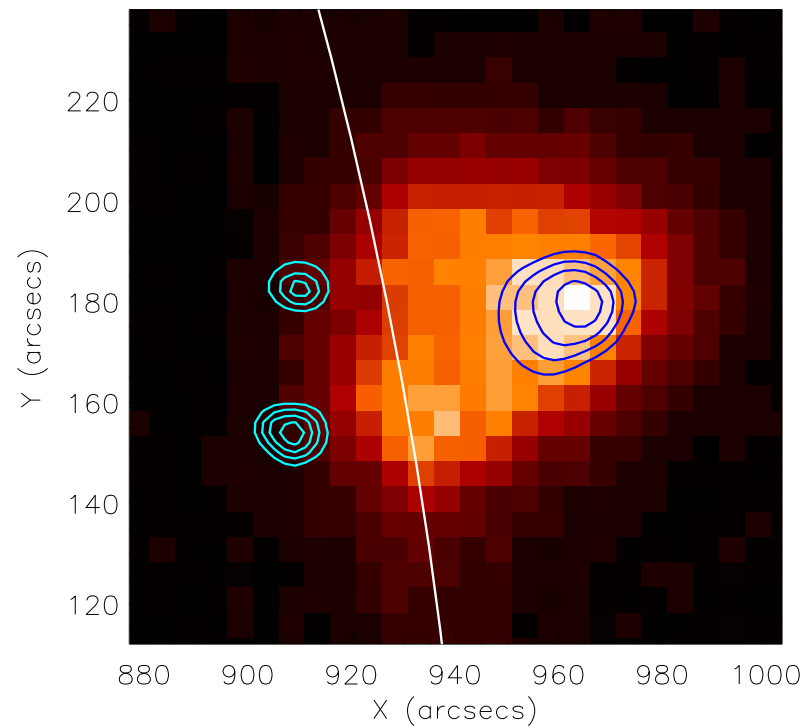- Evolution of loop

RHESSI 9-11 keV 13-Jul-2005 14:16:48.000 UT

RHESSI 31-39 keV 13-Jul-2005 14:16:48.000 UT

SXI-O P_THN_B 13-Jul-2005 14:19:04.133 UT

In the perfect world

- Will have a nice flare, observed simultaneously by RHESSI and Hinode

  $\rightarrow$ will solve the mystery of the too large spectral index difference