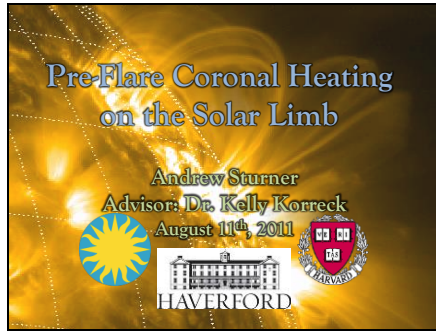
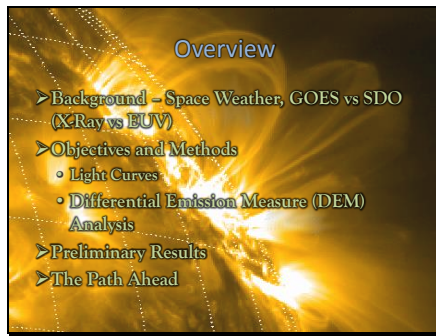


Slide 1



Slide 2



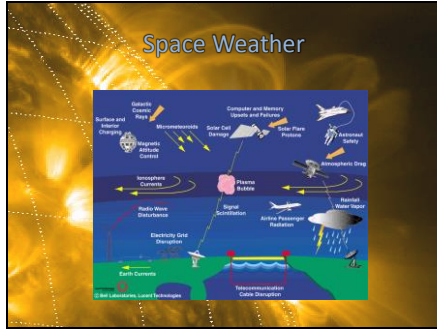
Space Weather

Slide 3



Next: Problems associated with Space Weather

Slide 4



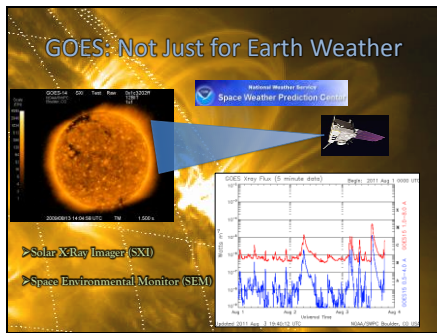
Next: We are not totally helpless- we have GOES

Slide 5



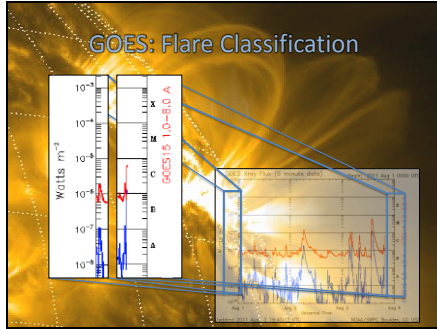
Next: Not only does GOES look at weather on Earth...

Slide 6



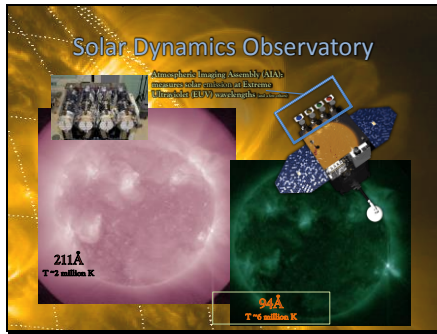
Next: Flare Classification

Slide 7



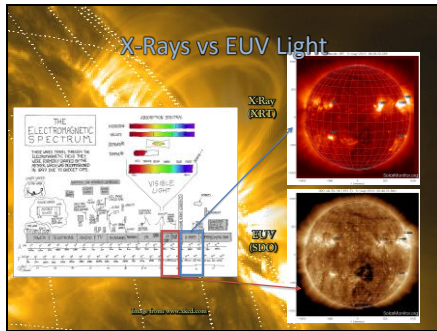
Next: GOES = operational instrument, not science, won't be around forever

Slide 8



12 second cadence, full disk images with resolution of 0.5 arcsec  
Next: However, there are some issues that we must work out if we choose to work in the EUV

Slide 9



Slide 10

**Objectives**

1. Quantitatively compare flare events in the EUV spectrum to the X-Ray spectrum
2. Characterize the time evolution of the temperature of the corona before a flare

**Methods**

1. Light Curves
2. Differential Emission Measure (DEM) Analysis

Slide 11

**Cirtain et al, 2006**

THE EUV UNRECORDED CORONA

Scale Height temperature for a flaring AR

Time (min) vs Scale Height temperature (K)

Time: 07:14 07:15 07:16 07:17

Source: JMA GDS of SDO 18A

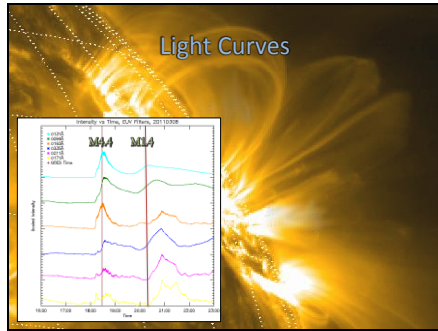
Next: We, too, can look at temperature evolution in the corona.

Slide 12

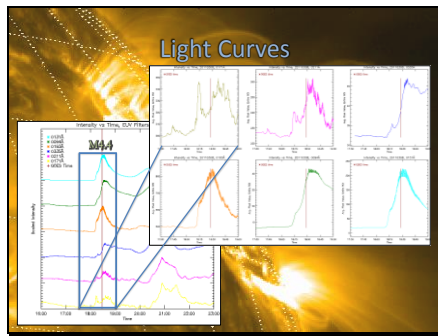
**Flares on the Limb**

- Flare Criteria:
  - > C-Class or larger
  - > On the limb
  - > Isolated (Event at least 12 hours before)

Slide 13



Slide 14

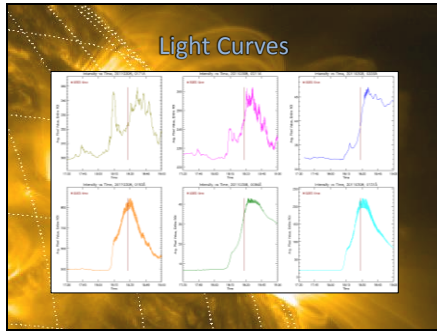


Next: Jagged edges would make statistical analysis impossible, so we need to remove the jitter. The fluctuations are due to saturated pixels.

Slide 15

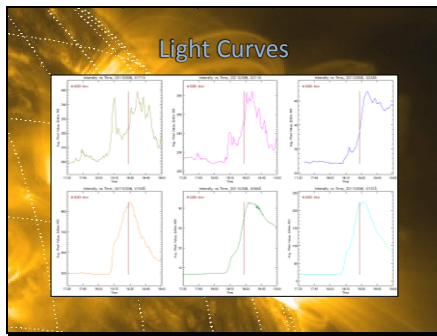


Slide 16



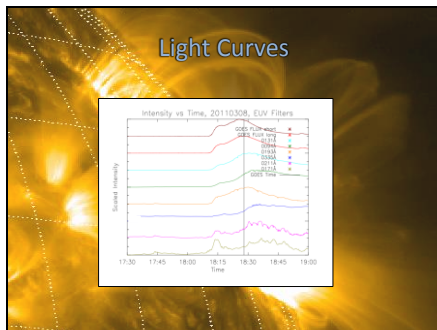
Next: And so, if we identify and remove a large percentage of the images that have many saturated pixels...

Slide 17



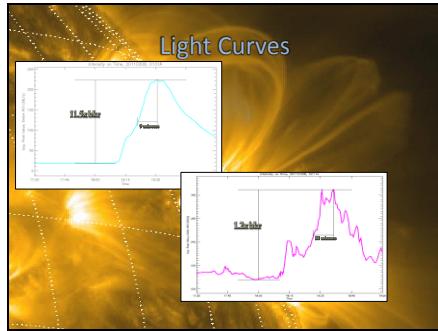
Next: We can stack these on top of each other

Slide 18



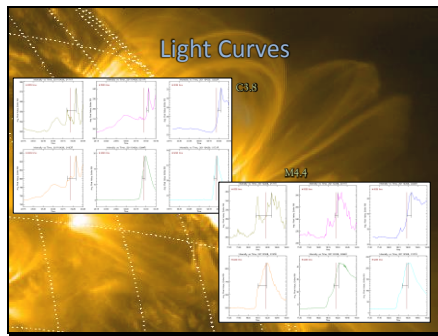
Next: we can also look at each curve individually

Slide 19



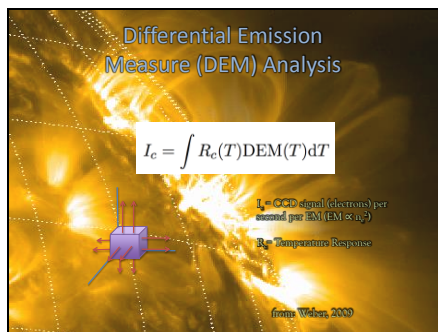
Next: and we can also compare one flare to another

Slide 20



Next: (no transition!)

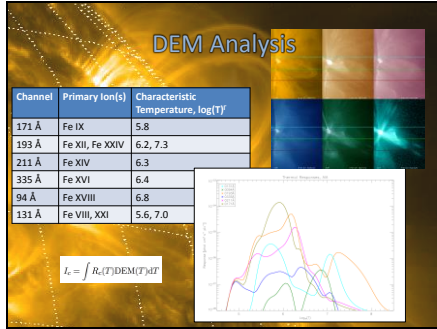
Slide 21



Looking to characterize the Emission Measure, which is dependent on its temperature

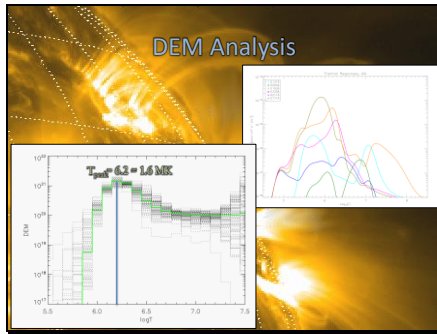
Next: So, we have two parts of this equation:

Slide 22



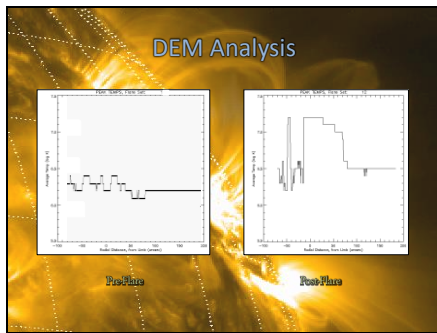
Averaging over 5 minutes of data, and over a 11-pixel wide box, at every radial distance point  
 Next: This is an equation with many variables and only a few unknowns.

Slide 23



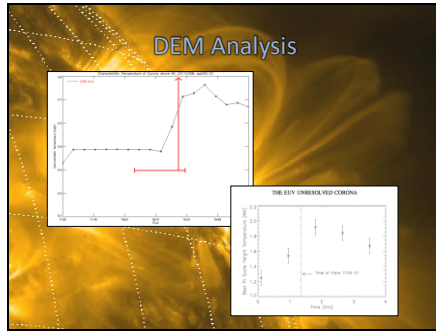
Next: We can take these peak temperatures, and plot to see how these peaks change as we move away from the limb of the sun

Slide 24



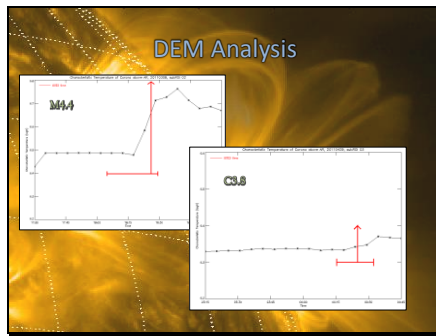
Next: These can fluctuate quite a bit, so if we average the peak temperatures over the entire image

Slide 25



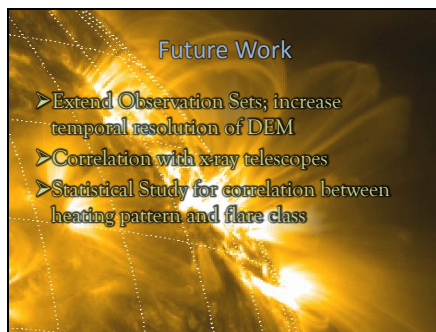
Next: So, we see a significant rise in the characteristic temperature in the corona as the flare evolves. However, we do not always see this sort of magnitude change

Slide 26



And other M-class flares had rises less dramatic, but in the middle of these two

Slide 27



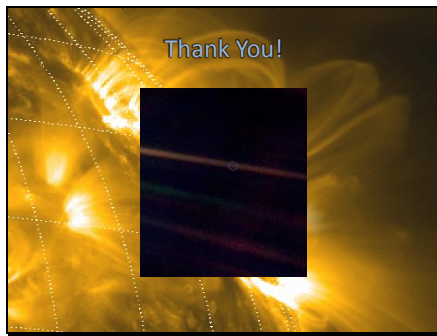
Slide 28



Acknowledgements

- > Dr. Kelly Korreck, for her help and guidance over the summer
- > Dr. Mark Wilson, who developed the DEM analysis code
- > Paolo, Paola, Kathy and the other members of the Solar and Stellar X-Ray Group at the Harvard Smithsonian Center for Astrophysics, for their support
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- > The Steering Committee of the Koshland Integrated Natural Science Center at Haverford College, for funding my summer work

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Thank You!

