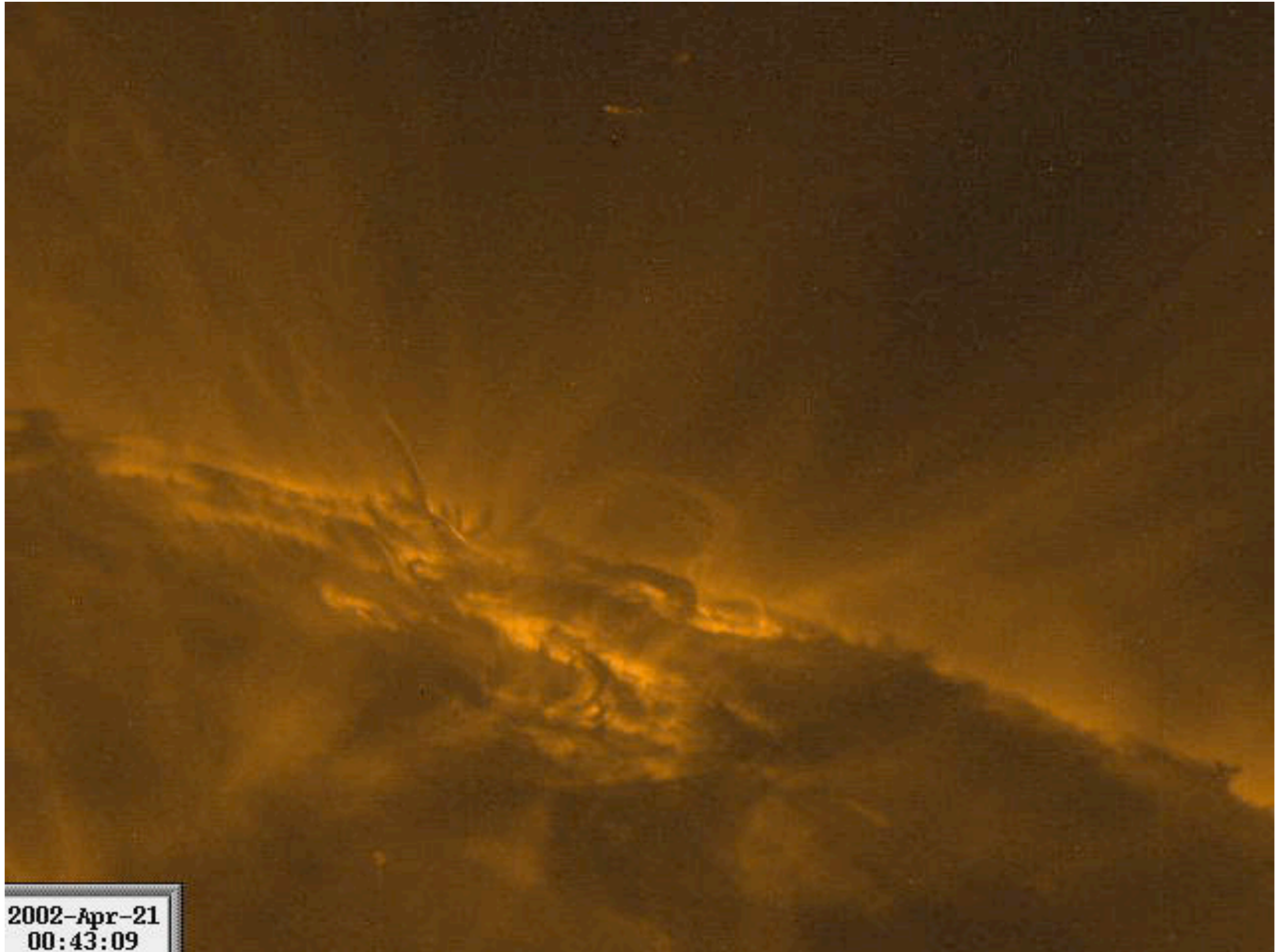


# Observations of Supra-arcade plasma in flares

Kathy Reeves

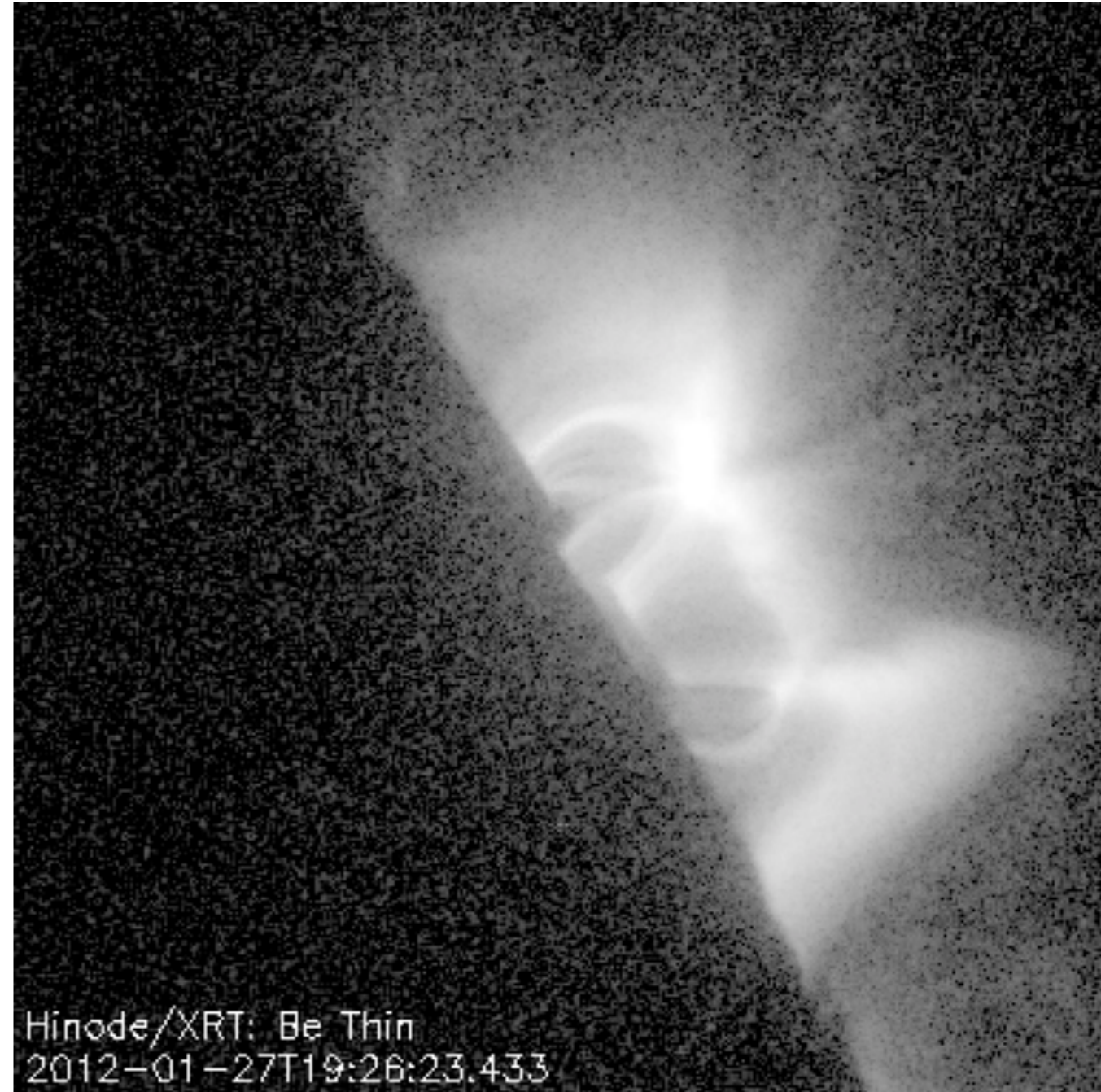
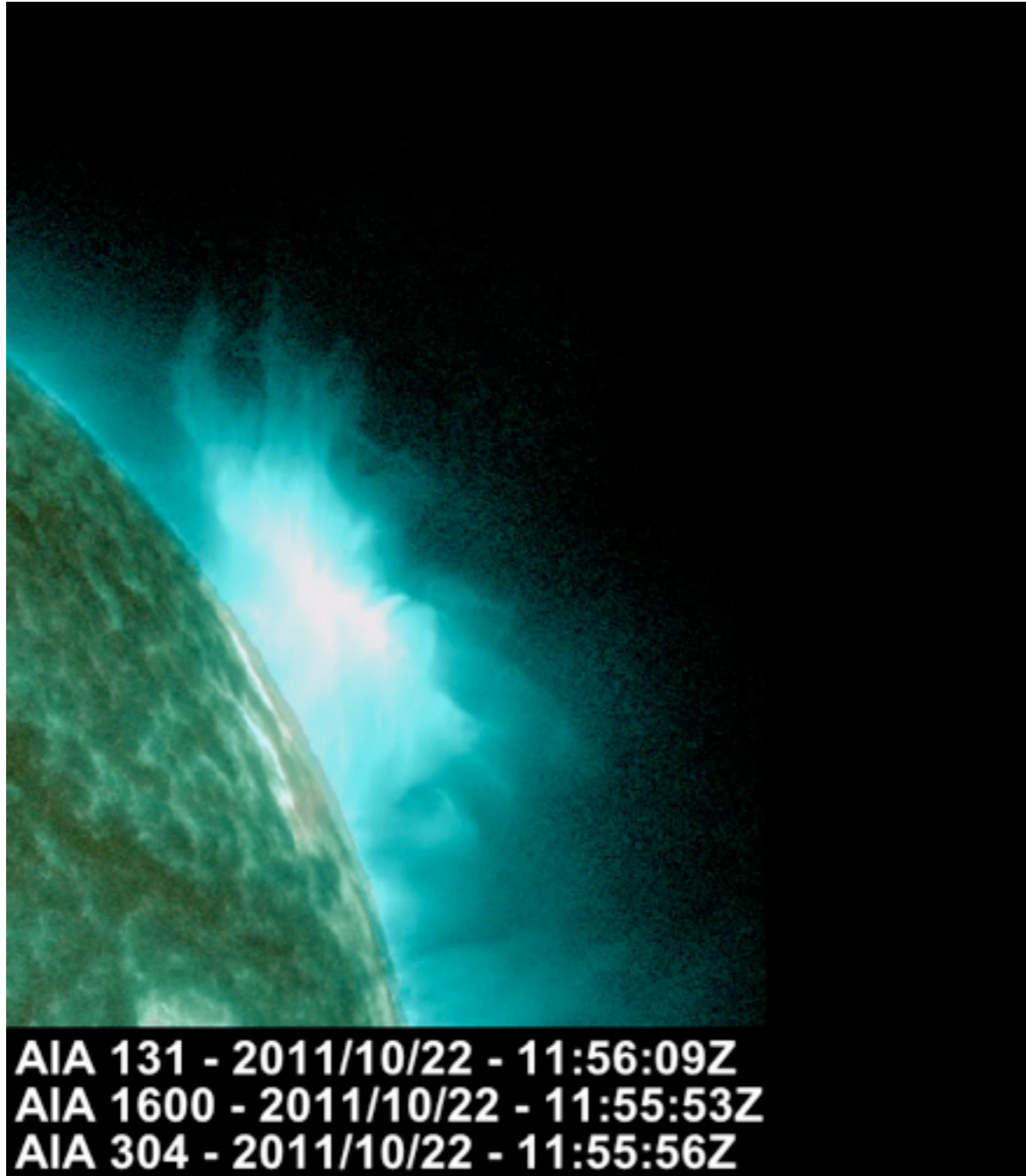
Harvard-Smithsonian Center for Astrophysics

# TRACE



2002-Apr-21  
00:43:09

# AIA & XRT

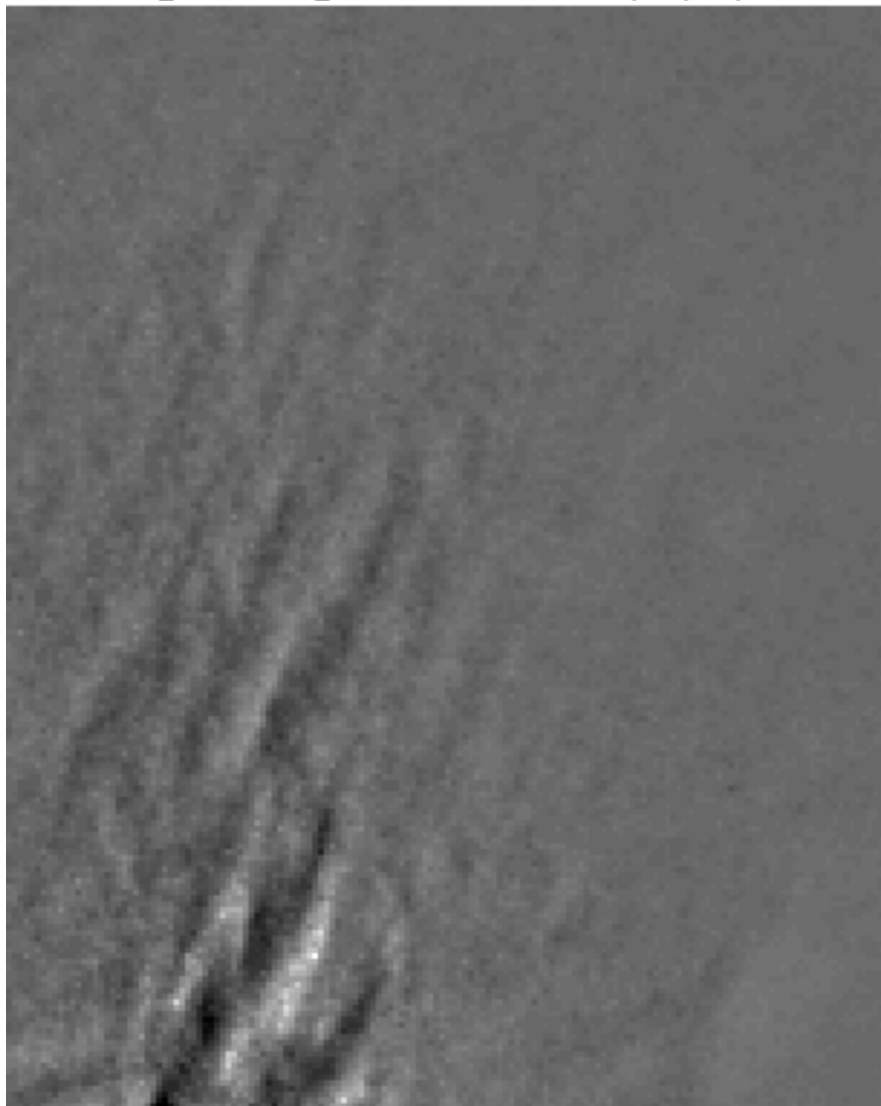




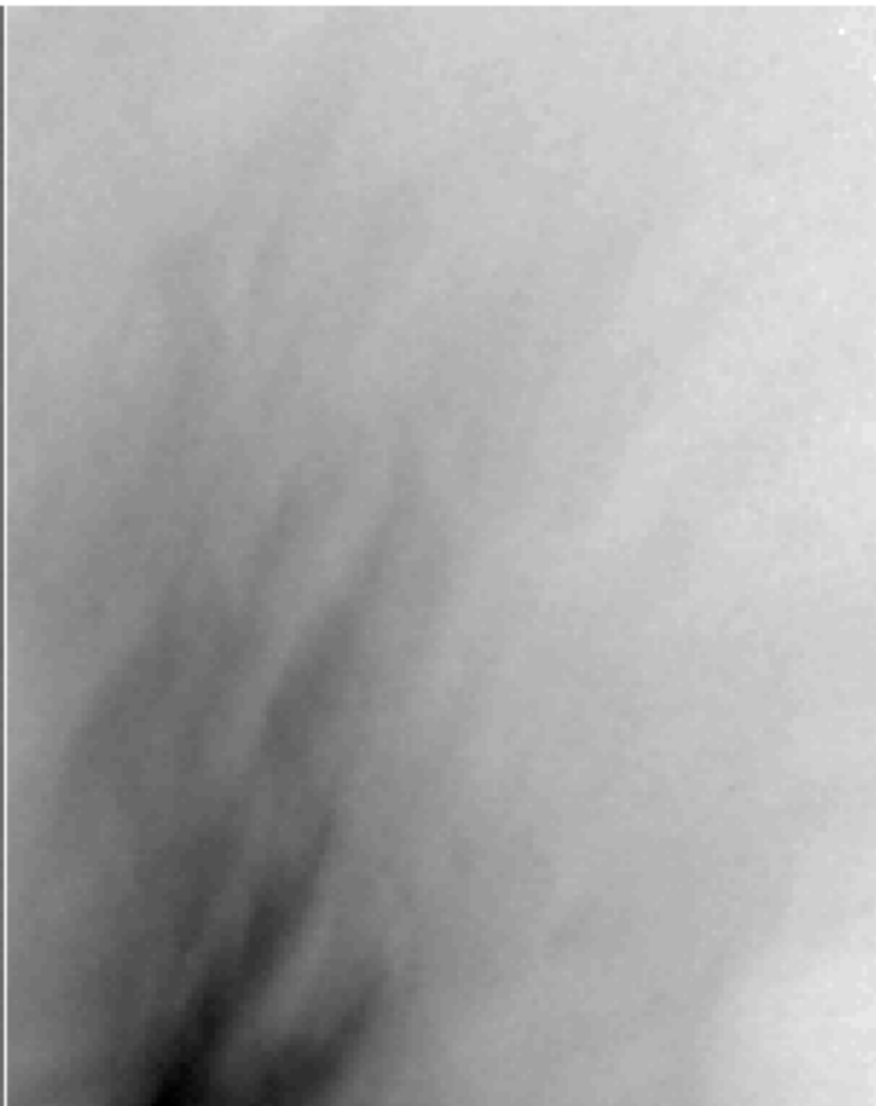
# New view

0 AIA\_20111022\_SADs to SADs 12:01:45.620

See Savage, McKenzie & Reeves, 2012



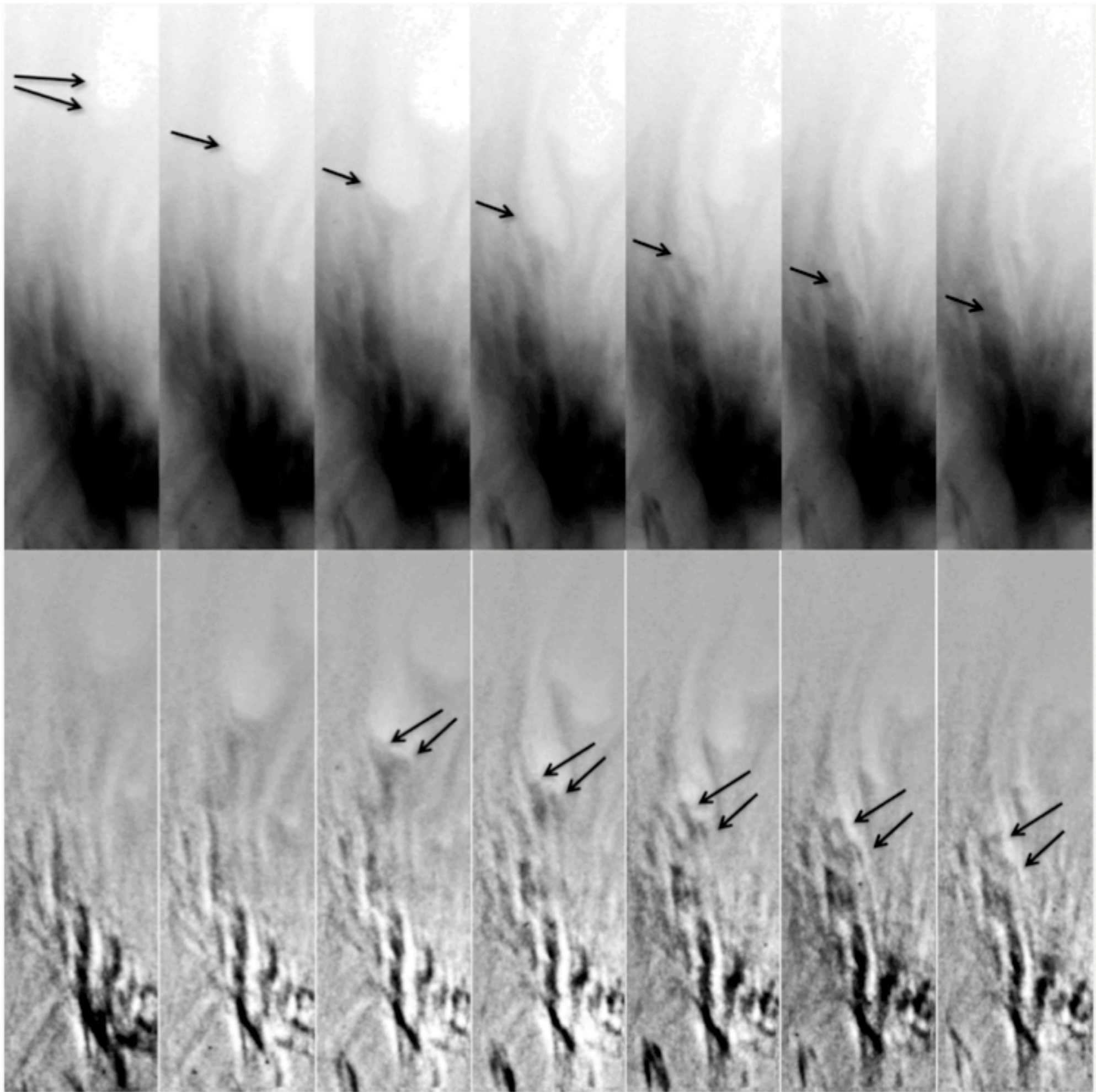
Difference images



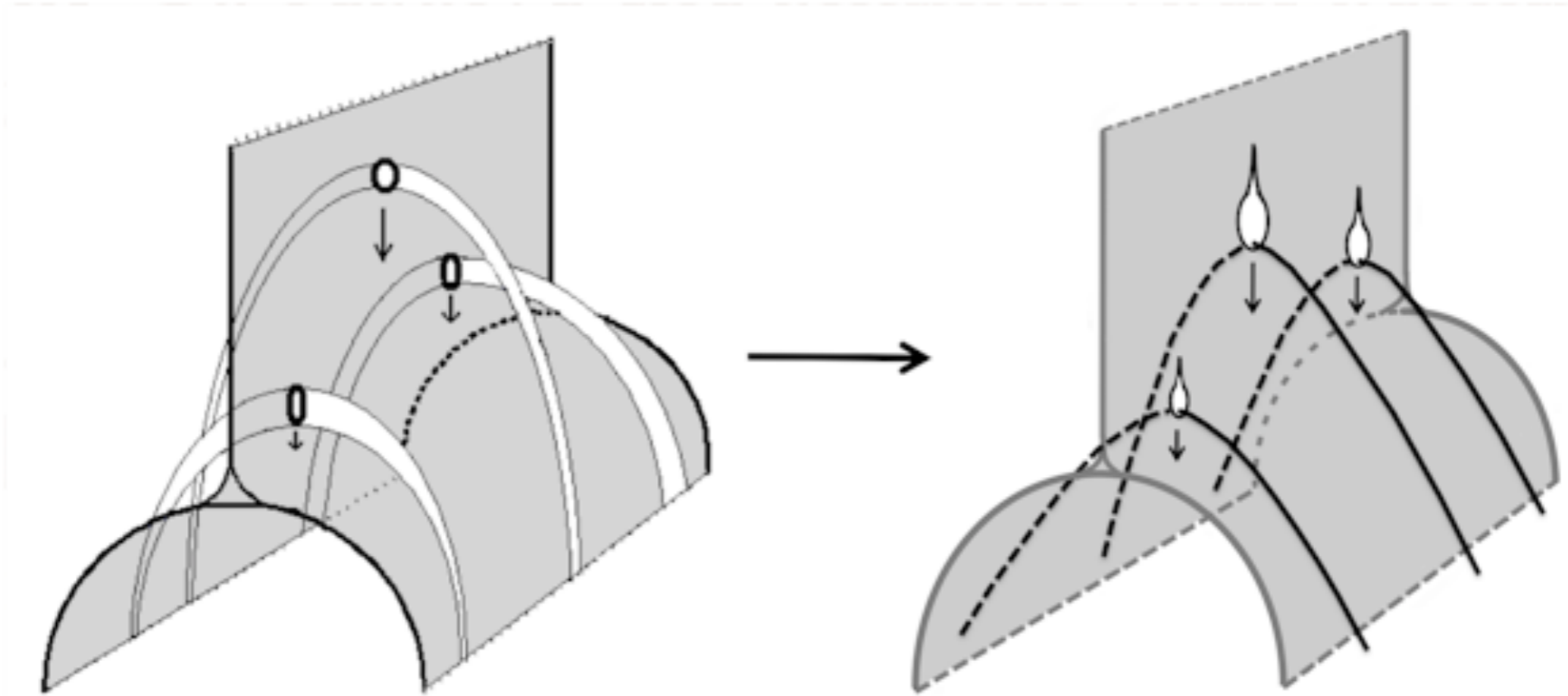
Original 131 images



Histogram-equalized



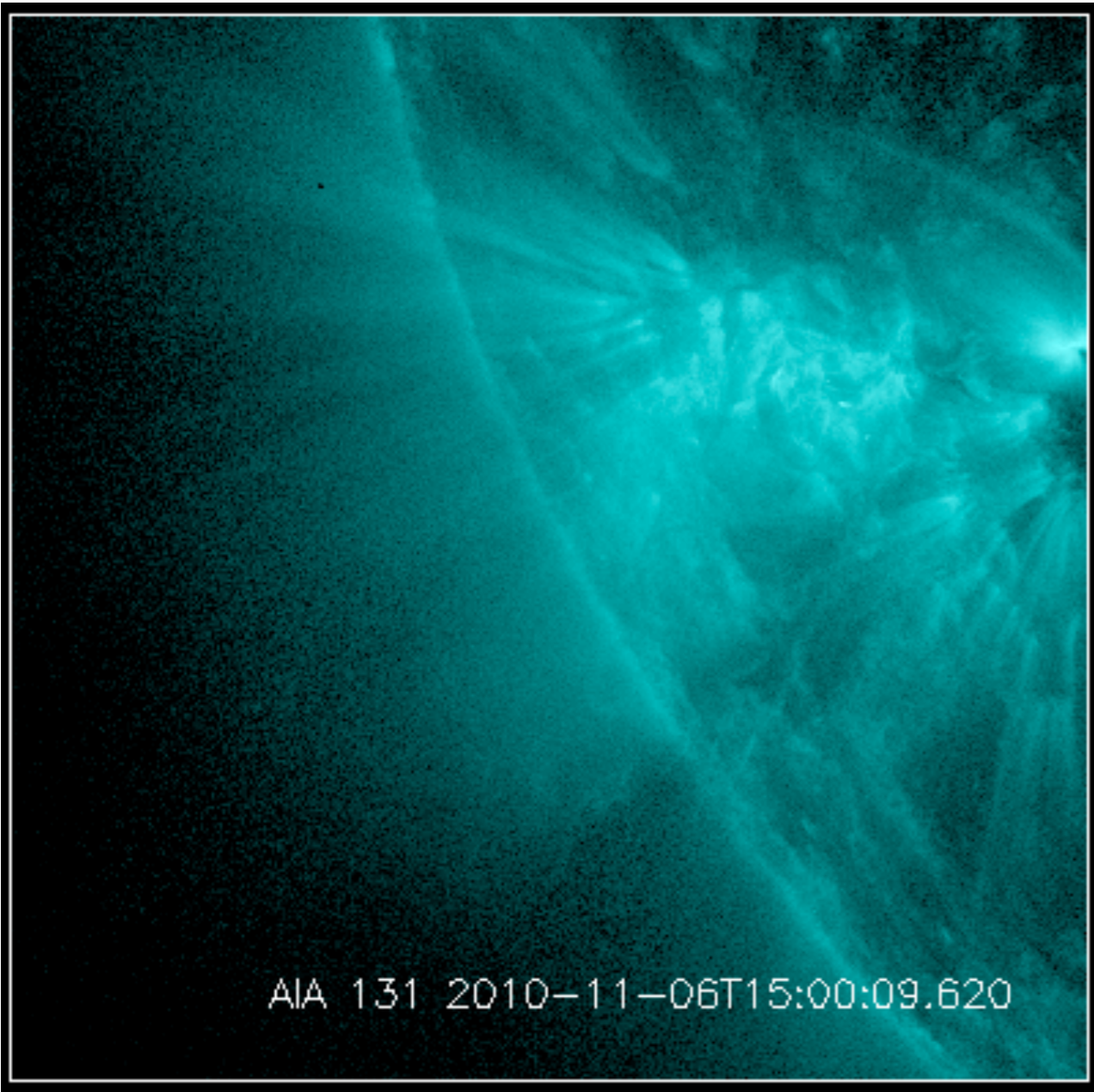
# New view



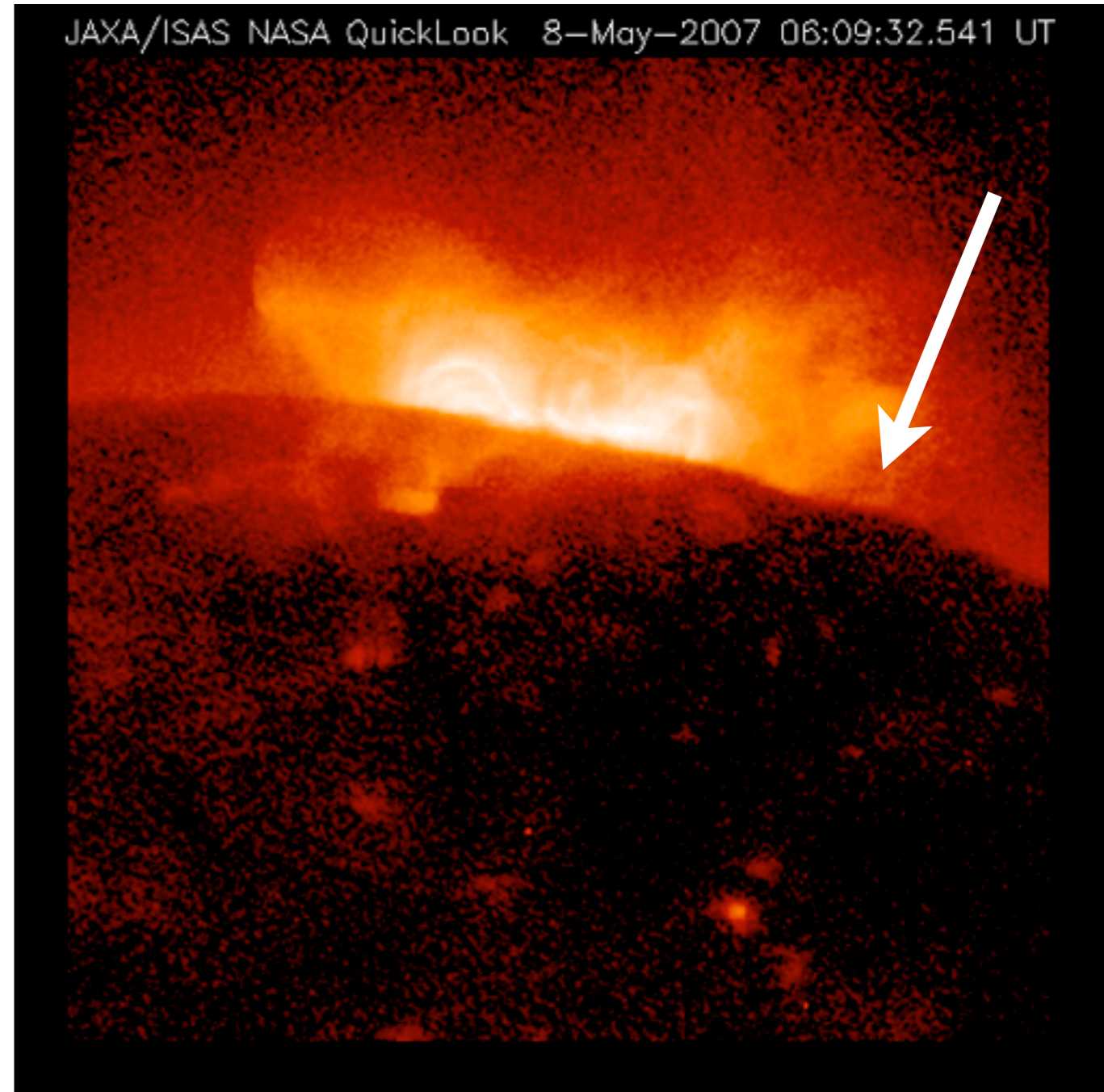
- SADs are not cross-sections of empty loops, but wakes(?) behind much smaller, filled loops.
- Previous estimates of size & flux of reconnected flux tubes, shrinkage energies have been overestimates.



# Eddies also visible

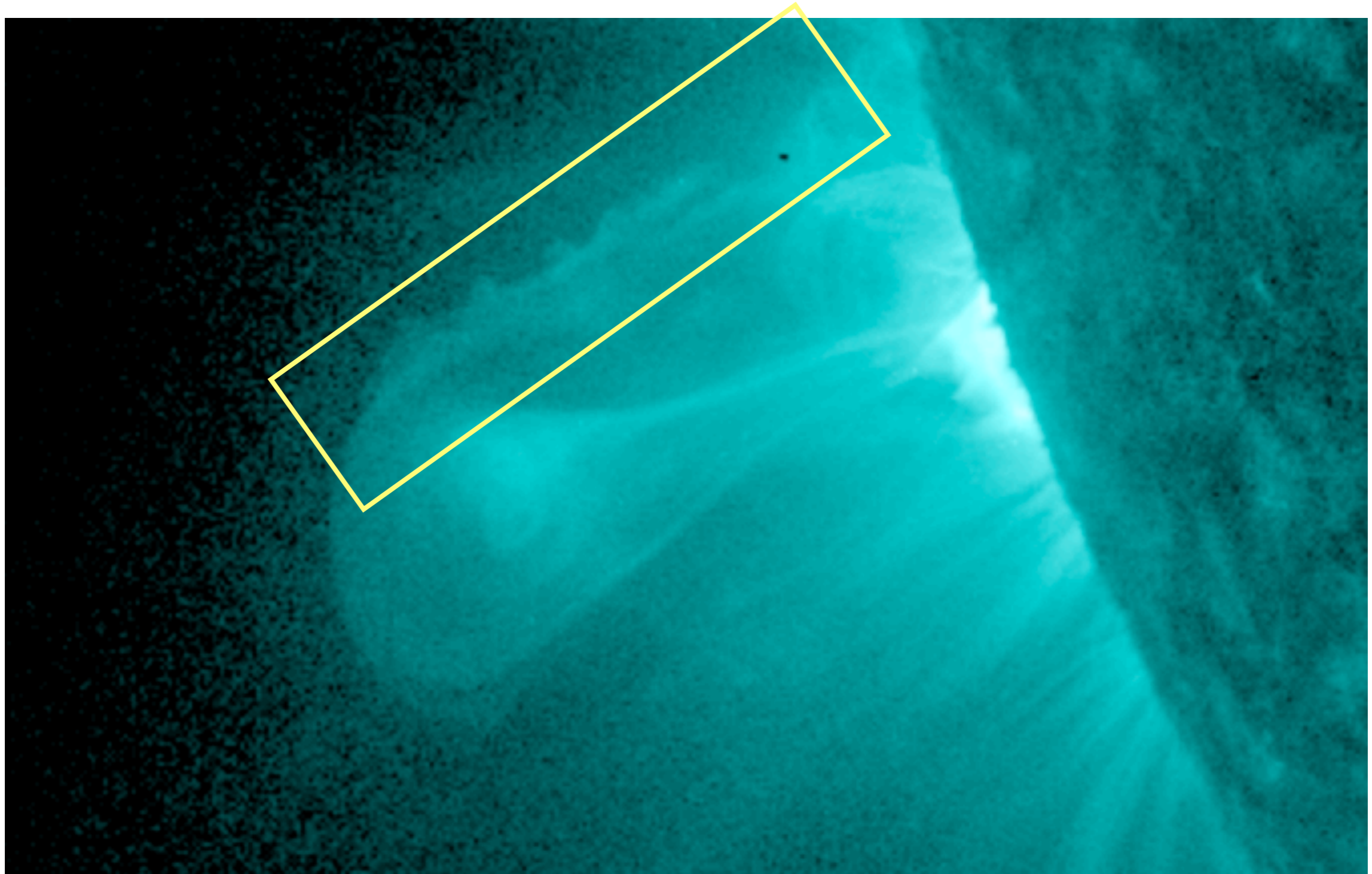


AIA 131 Å  
6-Nov-2010



XRT Ti-poly  
8-May-2007

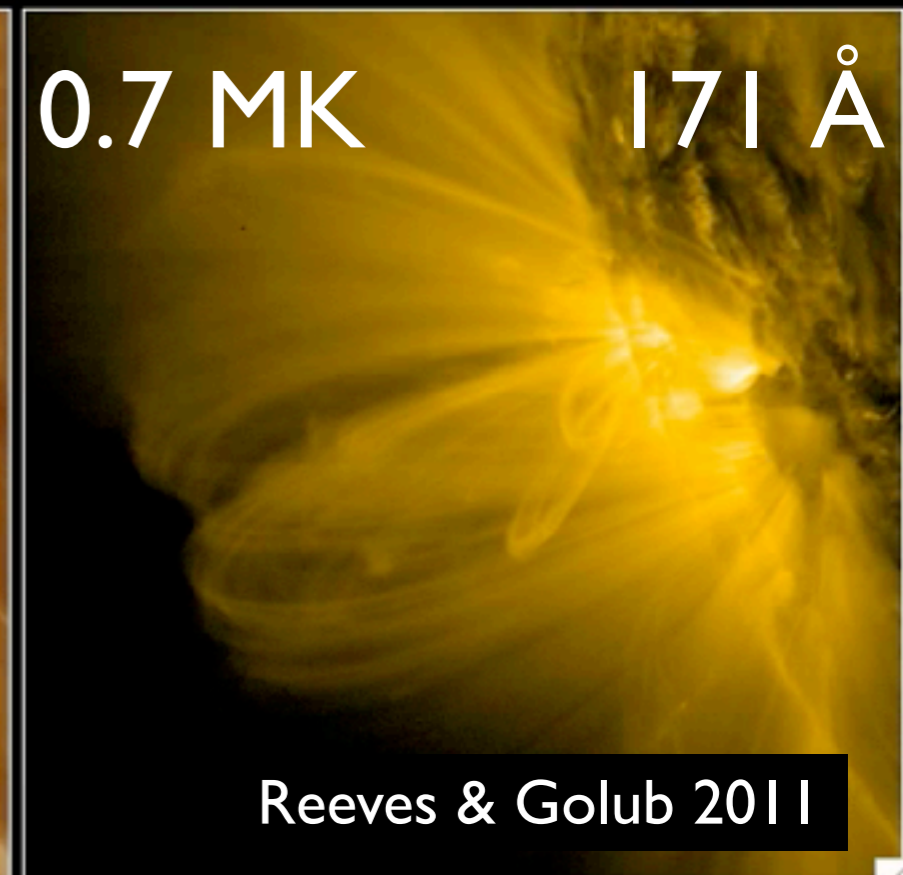
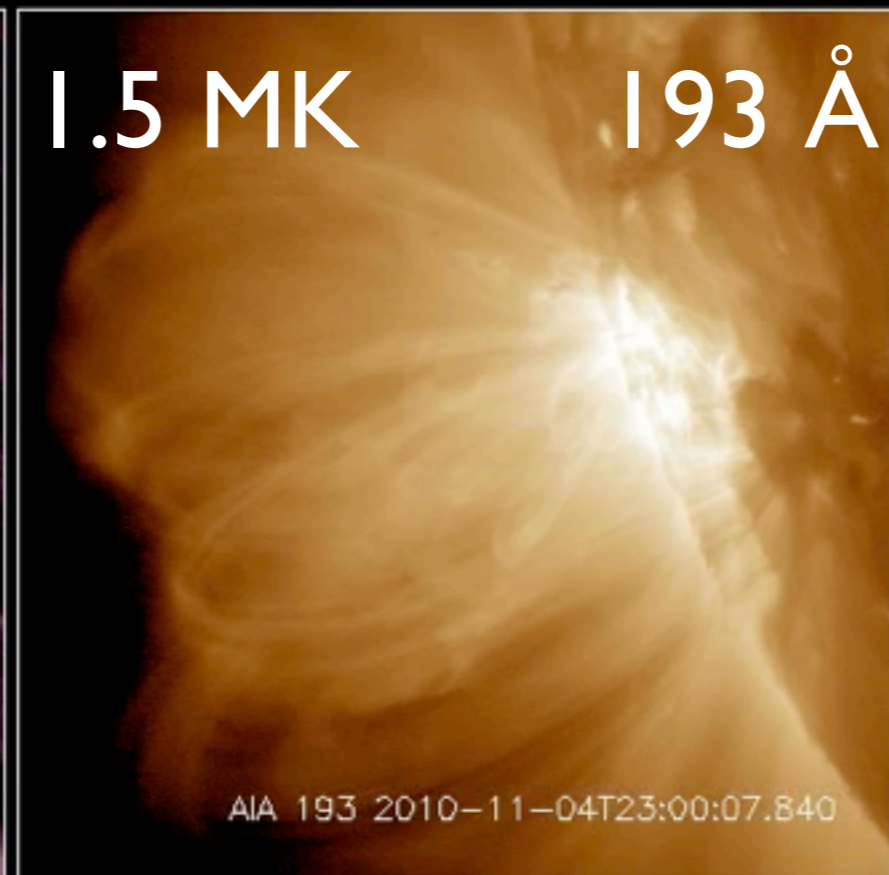
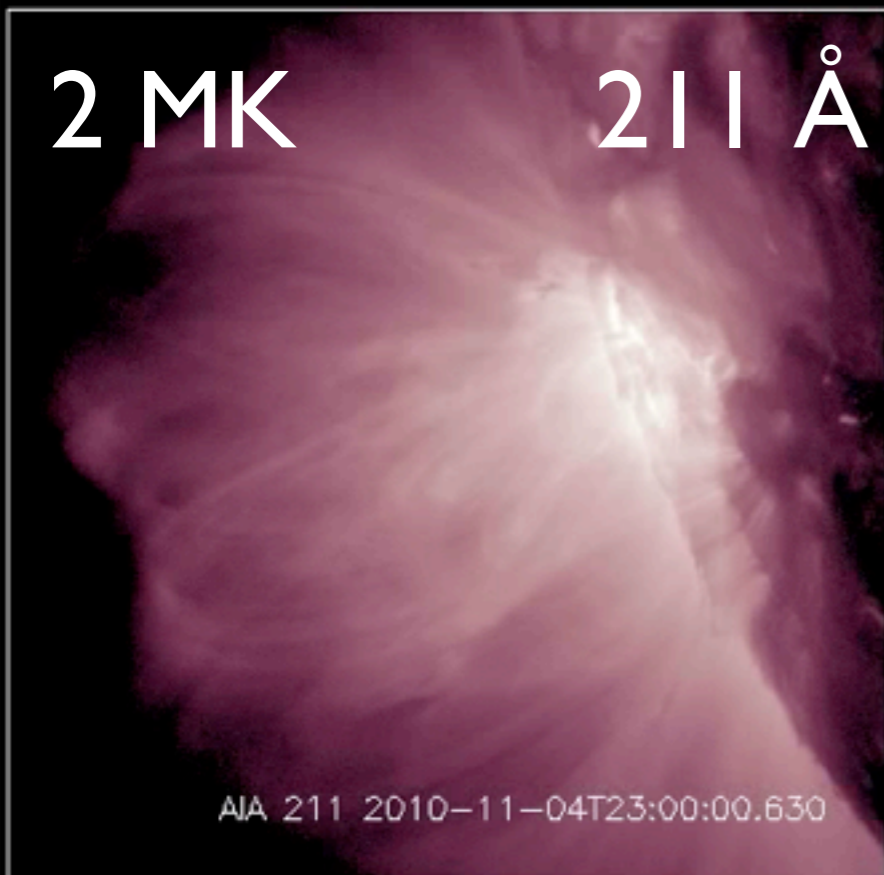
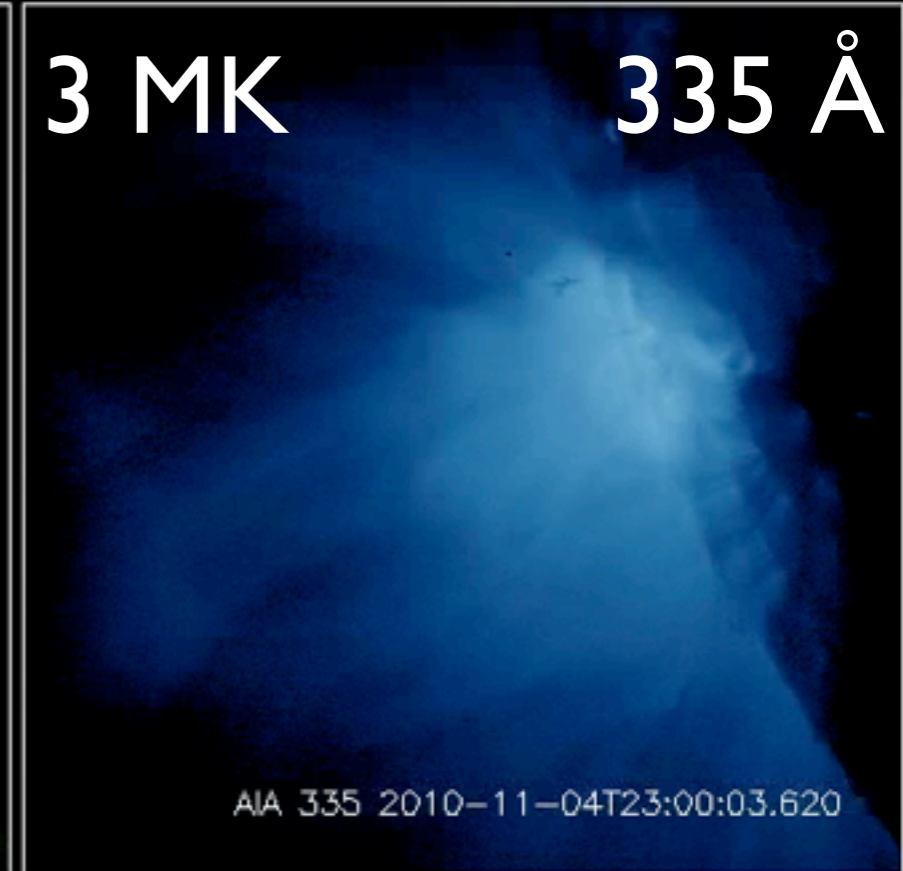
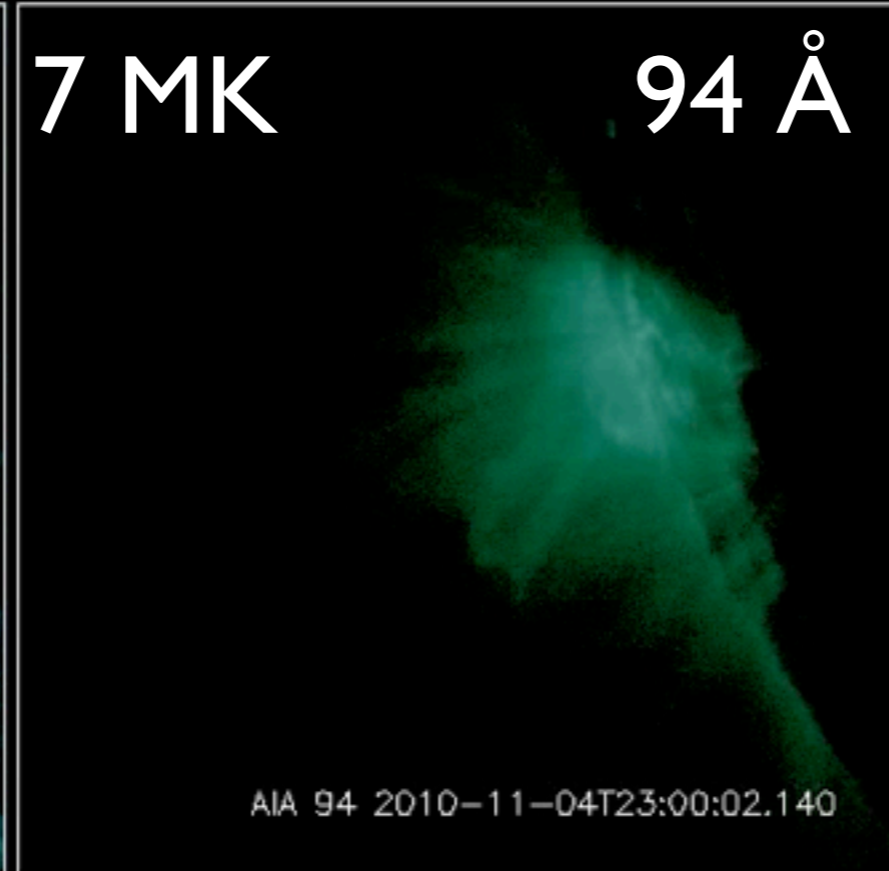
# K-H Instability



See Foullon et al., 2011



# Mostly hot plasma

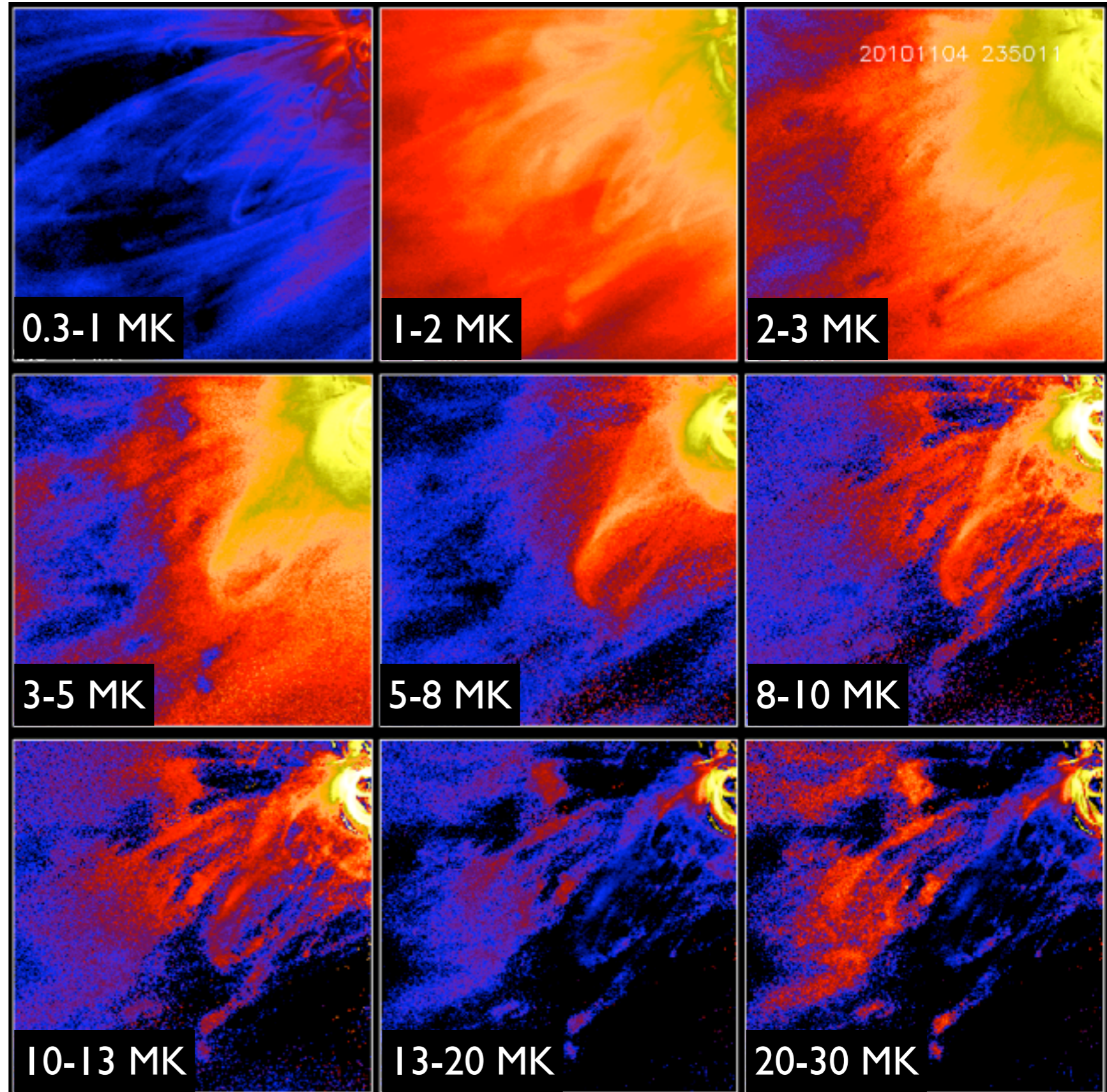
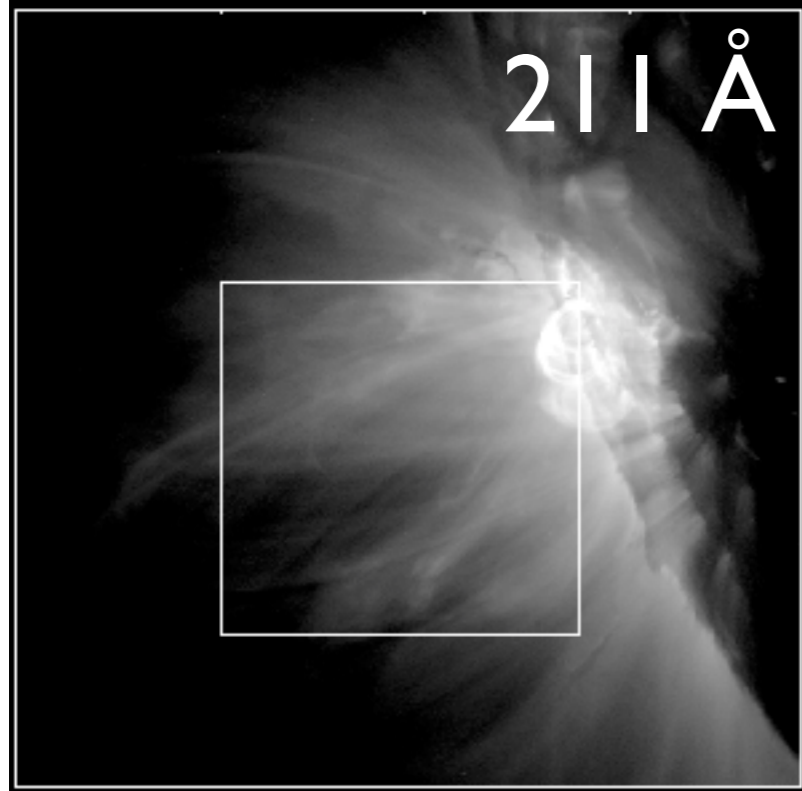
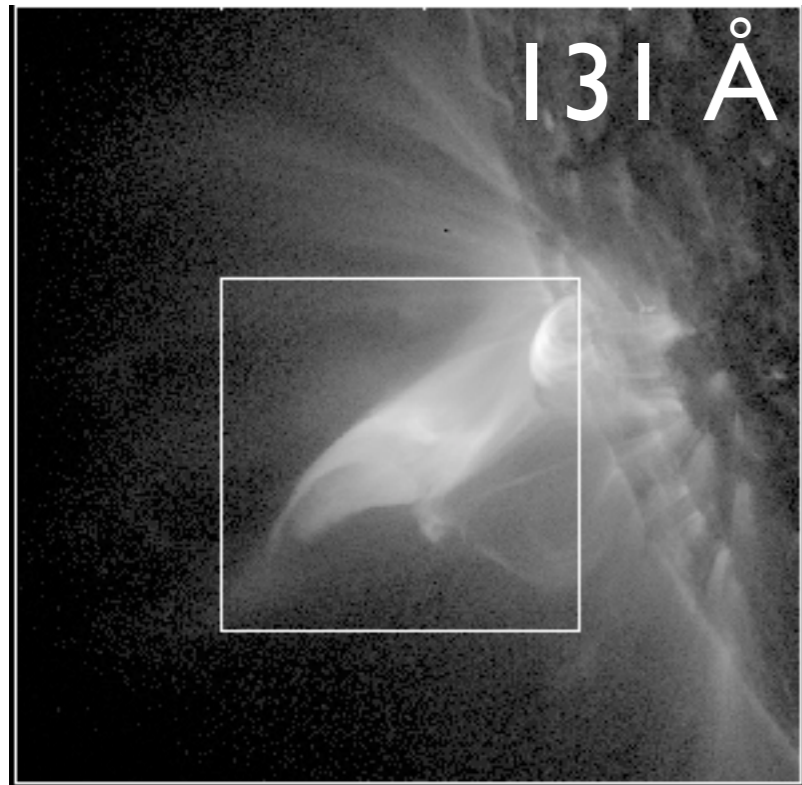


# DEM Temperature Reconstructions

- Calculate a DEM in each AIA pixel
- Integrate over temperature bins to get an estimated emission measure in each pixel
- Use the emission measure to make emission measure maps at each pixel.



# EM Maps





# Conclusions

- “Voids” in supra-arcade plasma are not cross-sections of empty flux tubes, but rather are areas of cleared-out density behind small shrinking loops (is “wake” a good word?)
- Supra-arcade plasma is hot, dynamic and finely structured

# Open questions

- What is the magnetic field structure in the current sheet? Is the plasma frozen in?
- Why is the current sheet emitting?
- What is the plasma beta in the current sheet?
- Are plasma instabilities at play (i.e R-T, K-H)?