

# Preview of First Results from Hi-C 2.1 and IRIS



PS: Sabrina Savage (MSFC)

PI: Amy Winebarger (MSFC)

IS: Laurel Rachmeler (MSFC)



Science Team:

David Brooks (GMU)  
Jonathan Cirtain (BWXT)  
Ken Kobayashi (MSFC)  
Scott McIntosh (HAO)  
David McKenzie (MSFC)

Leon Golub (SAO)  
Robert Walsh (UCLAN)  
Bart DePontieu (LMSAL)

Richard Morton (Northumbria)  
Hardi Peter (MPS)  
Paola Testa (SAO)  
Sanjiv Tiwari (BAERI)  
Harry Warren (NRL)

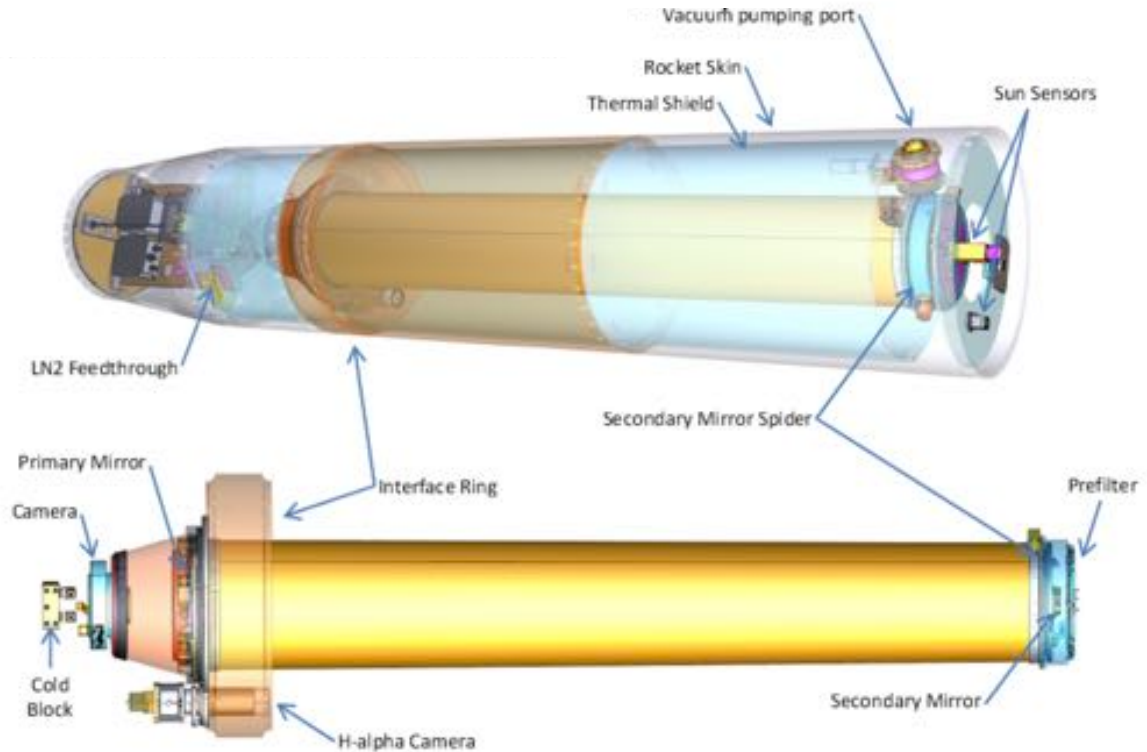


# Hi-C: High-resolution Coronal imager

Telescope design capable of ~0.2-0.3" spatial resolution imaging of the corona.

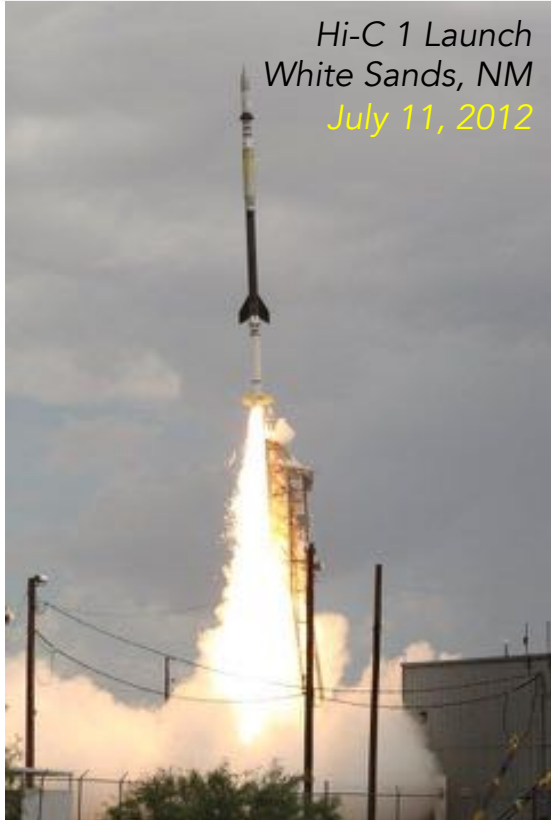
Pointing stability necessary to achieve resolution goal.

Image readout duration and data storage system capable of maintaining high-cadence observations.



# Hi-C 1 results

Hi-C 1 Launch  
White Sands, NM  
July 11, 2012



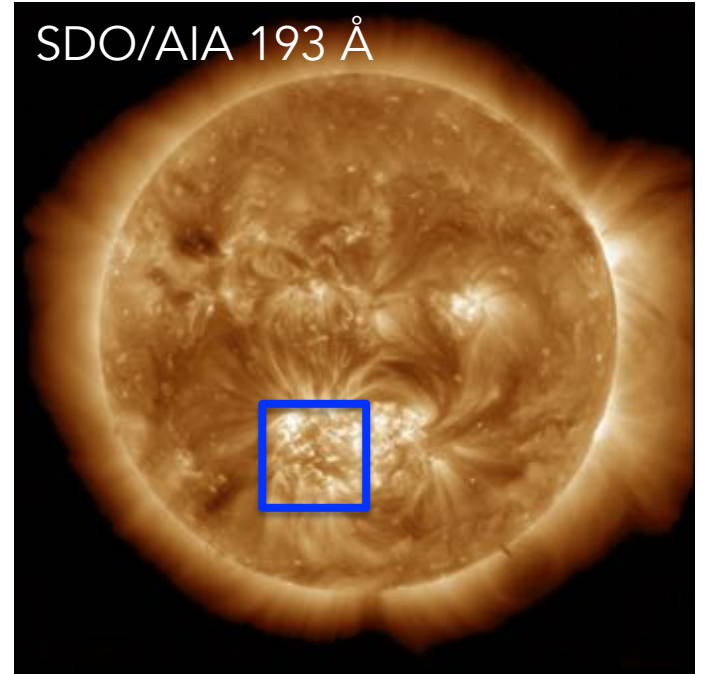
Active Region 11520 – 193 Å

26 publications for 5 minutes  
of data!

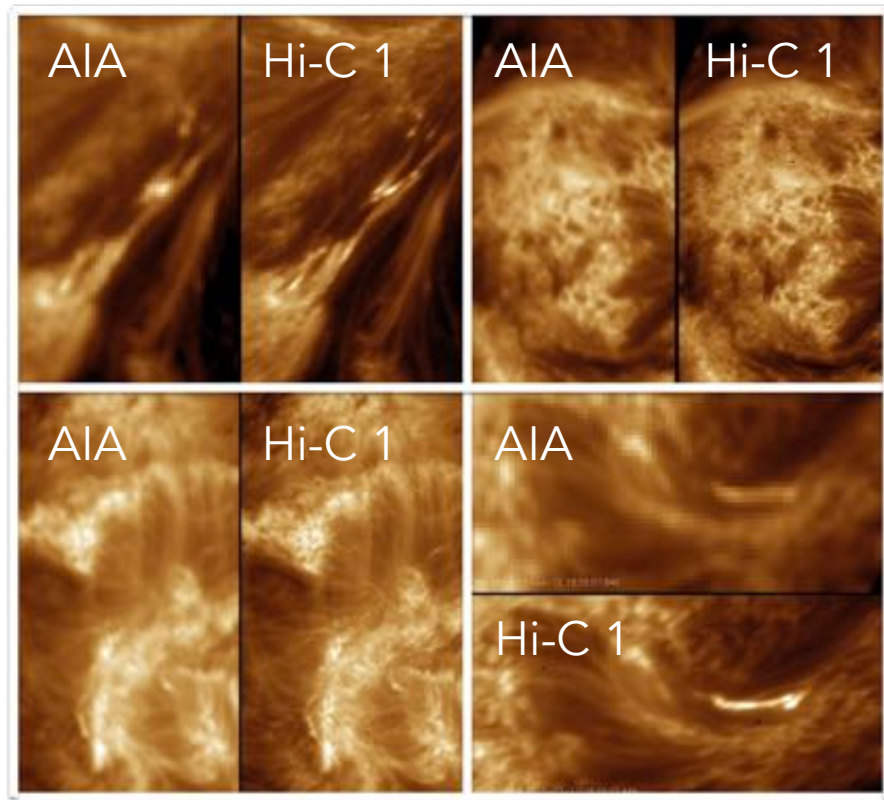
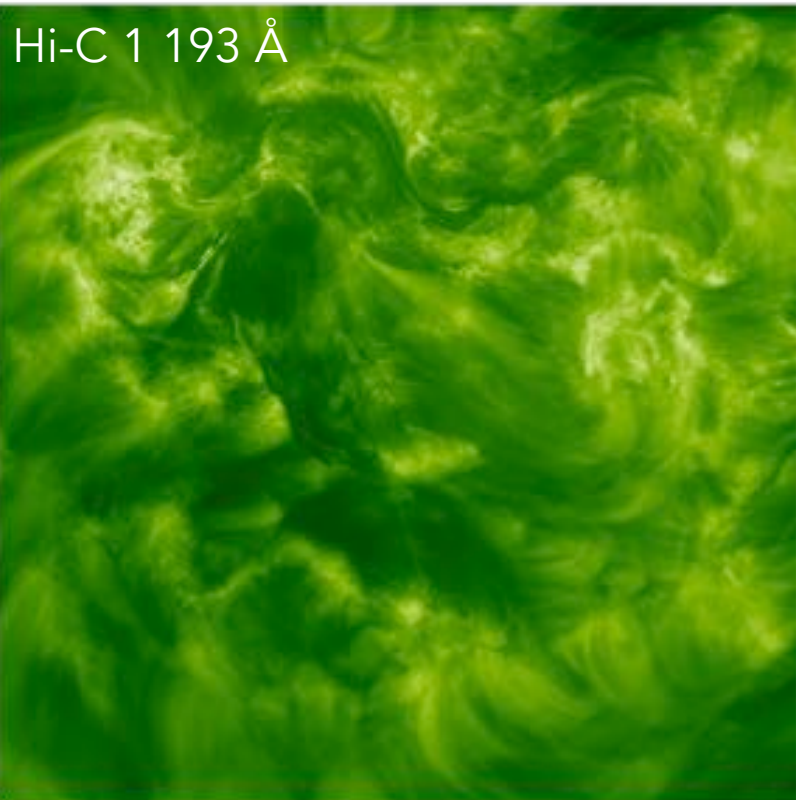
Science highlights:

- Braided loops triggering energy release through magnetic reconnection (*Cirtain et al. 2013, Nature*)
- Subflare triggers
- Nanoflare heating
- Loop sub-structure
- Moss dynamics
- Penumbra jets
- Flows along filament threads
- MHD waves

SDO/AIA 193 Å

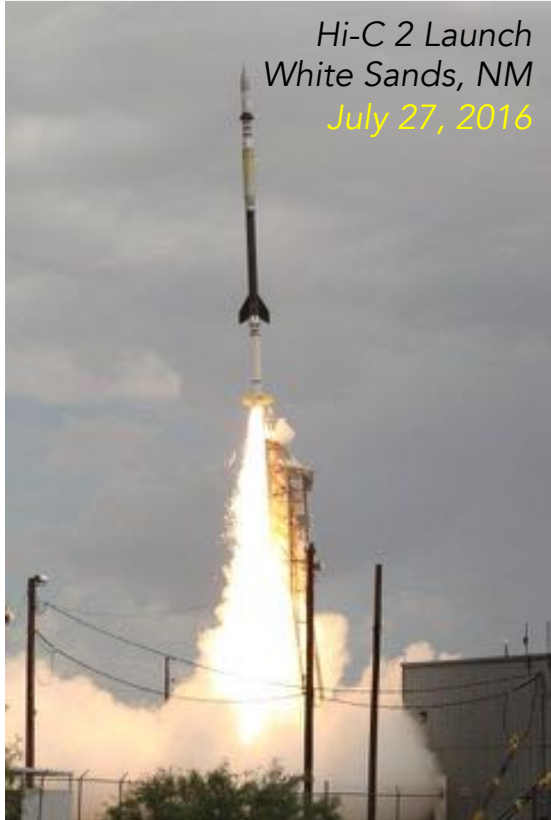


# Hi-C 1 results



# Hi-C 2

Hi-C 2 Launch  
White Sands, NM  
July 27, 2016



Hi-C 2 mirror recoated to explore the important Chromospheric-Coronal Connection by targeting specific candidates likely to contribute to coronal heating:

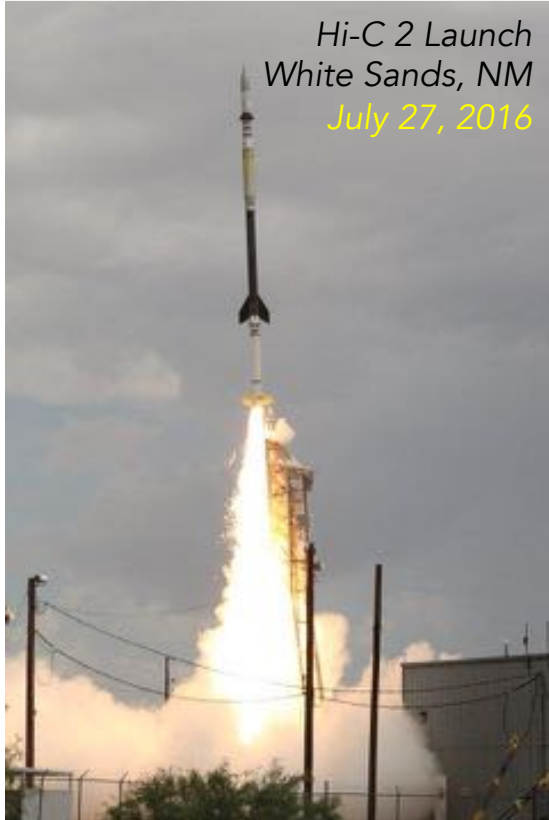
1. Type II spicules
2. Hot active region core loops

## Updates for re-flight:

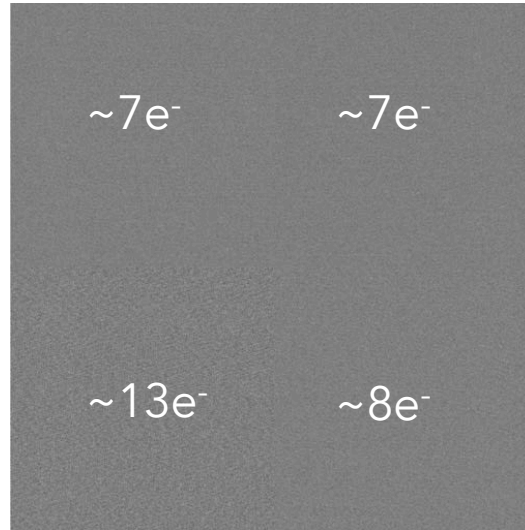
- Cooler bandpass centered on **172 Å**
- Significant improvement in camera quality (new MSFC-build designed for super low noise)
- **IRIS!**

# Hi-C 2 results

Hi-C 2 Launch  
White Sands, NM  
July 27, 2016



Fantastic flight performance  
verification of the low-noise  
MSFC-built camera.



# Hi-C 2.1

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Cleaned up

Checked alignment

Upgraded cooling system

Added Hall Effect Sensor

Re-proposed

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# Hi-C 2.1

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3.5 months after ATP....

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# Hi-C 2.1

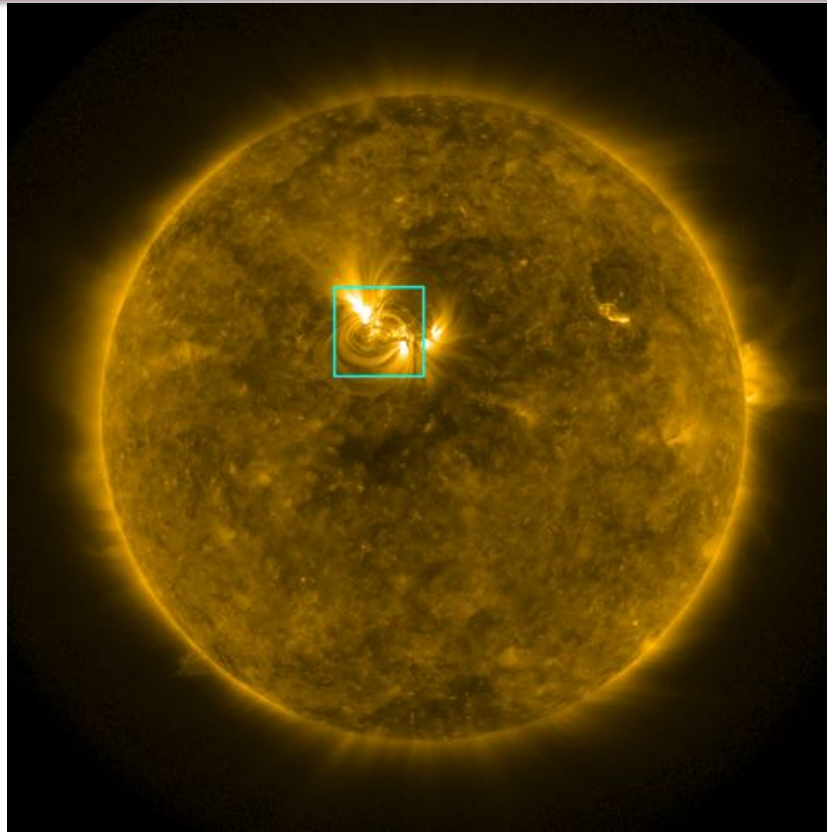
Hi-C 2.1 Launch  
White Sands, NM  
May 29, 2018



# Hi-C 2.1 Observations

2018 May 29  
18:54 UT

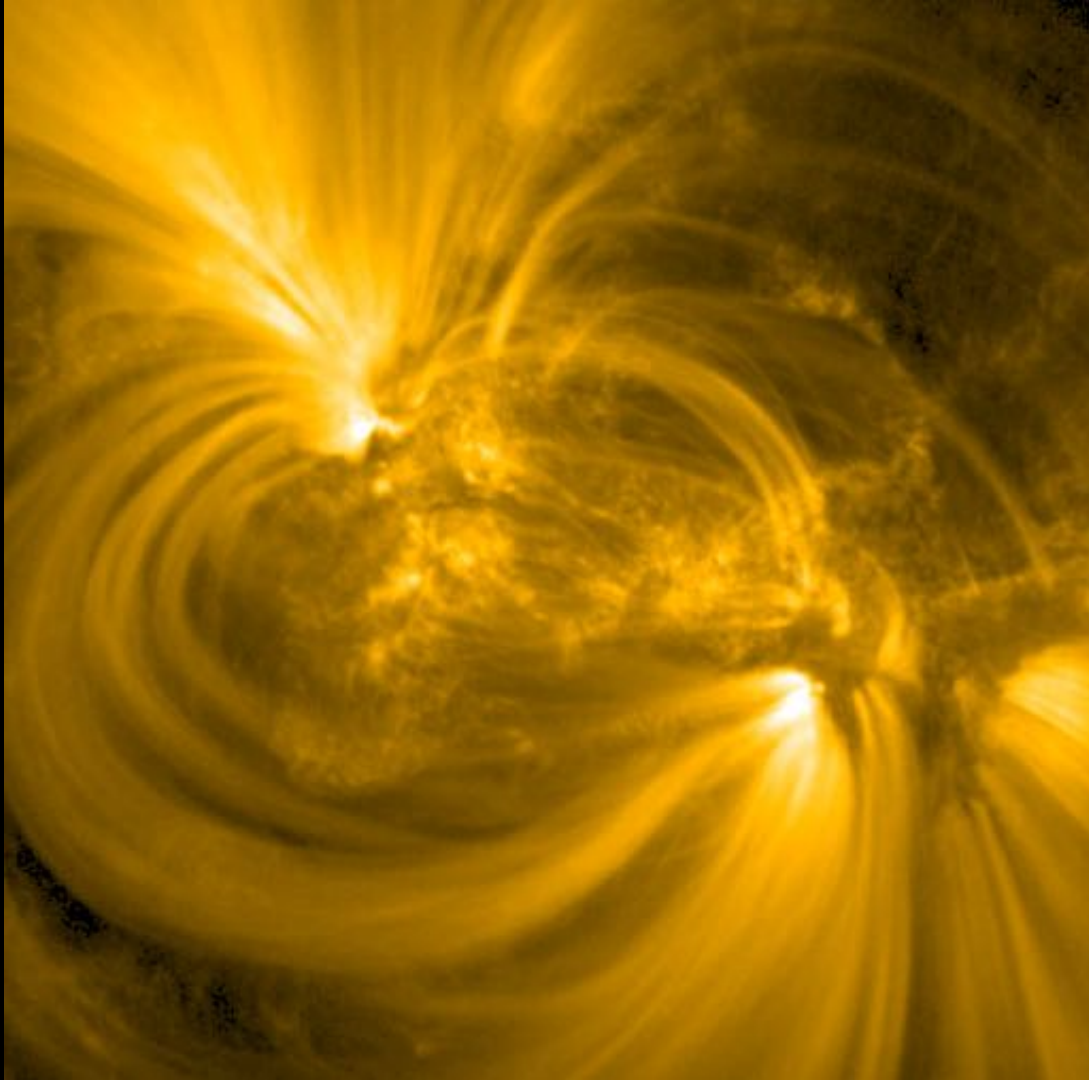
Target: AR 12712



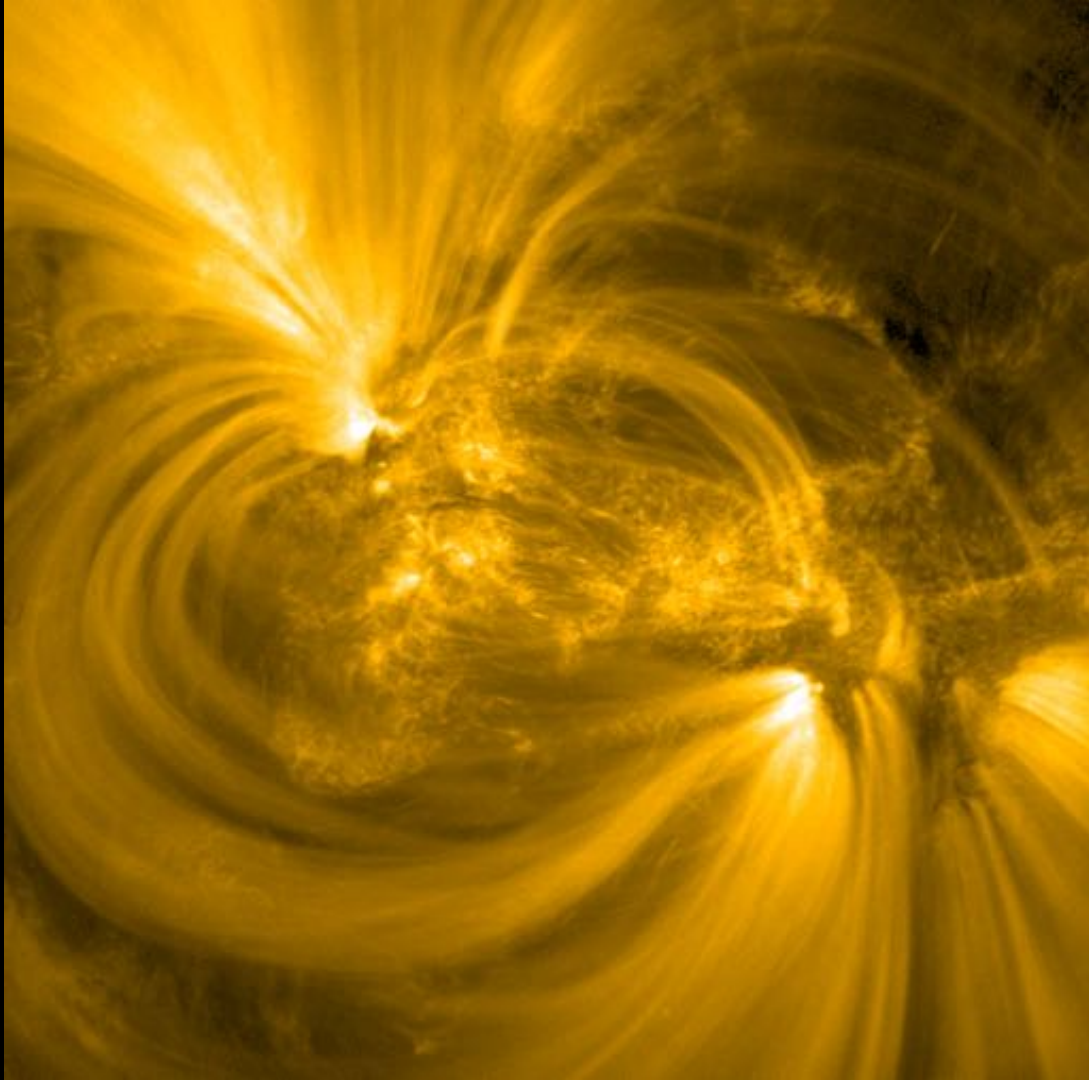
~ 15 minute flight

~ 5 minutes of solar  
viewing data

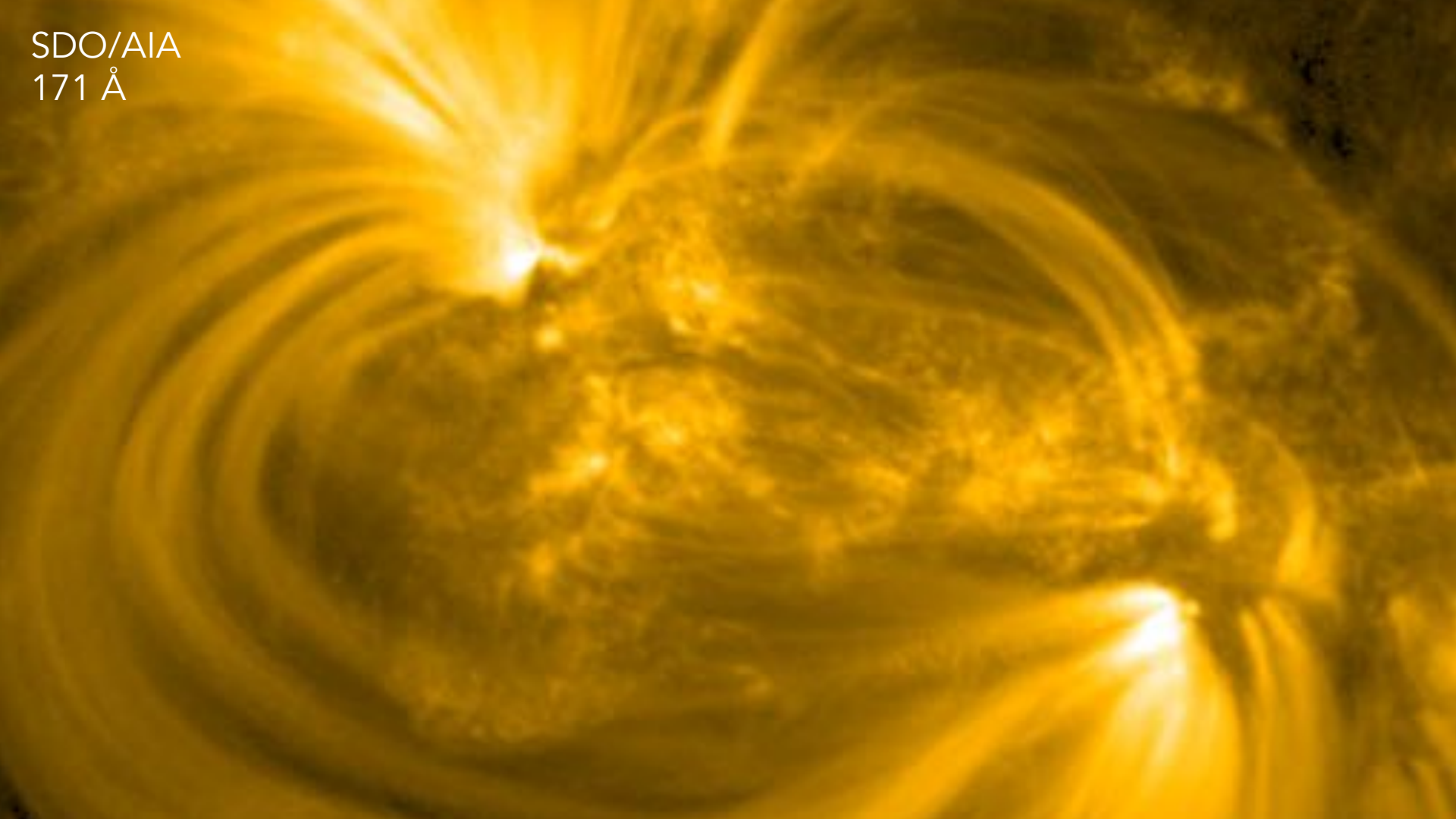
SDO/AIA  
171 Å



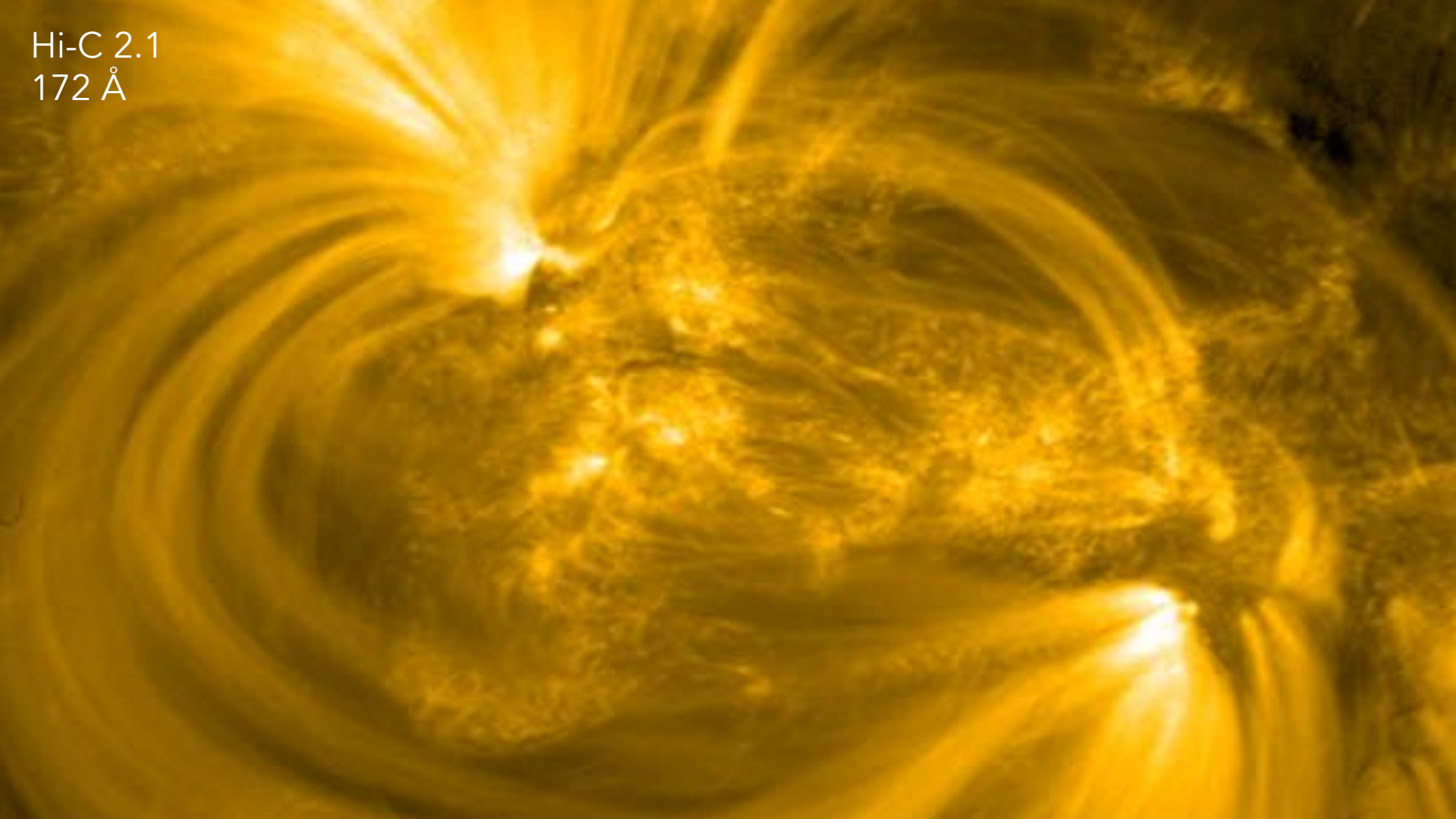
Hi-C 2.1  
172 Å

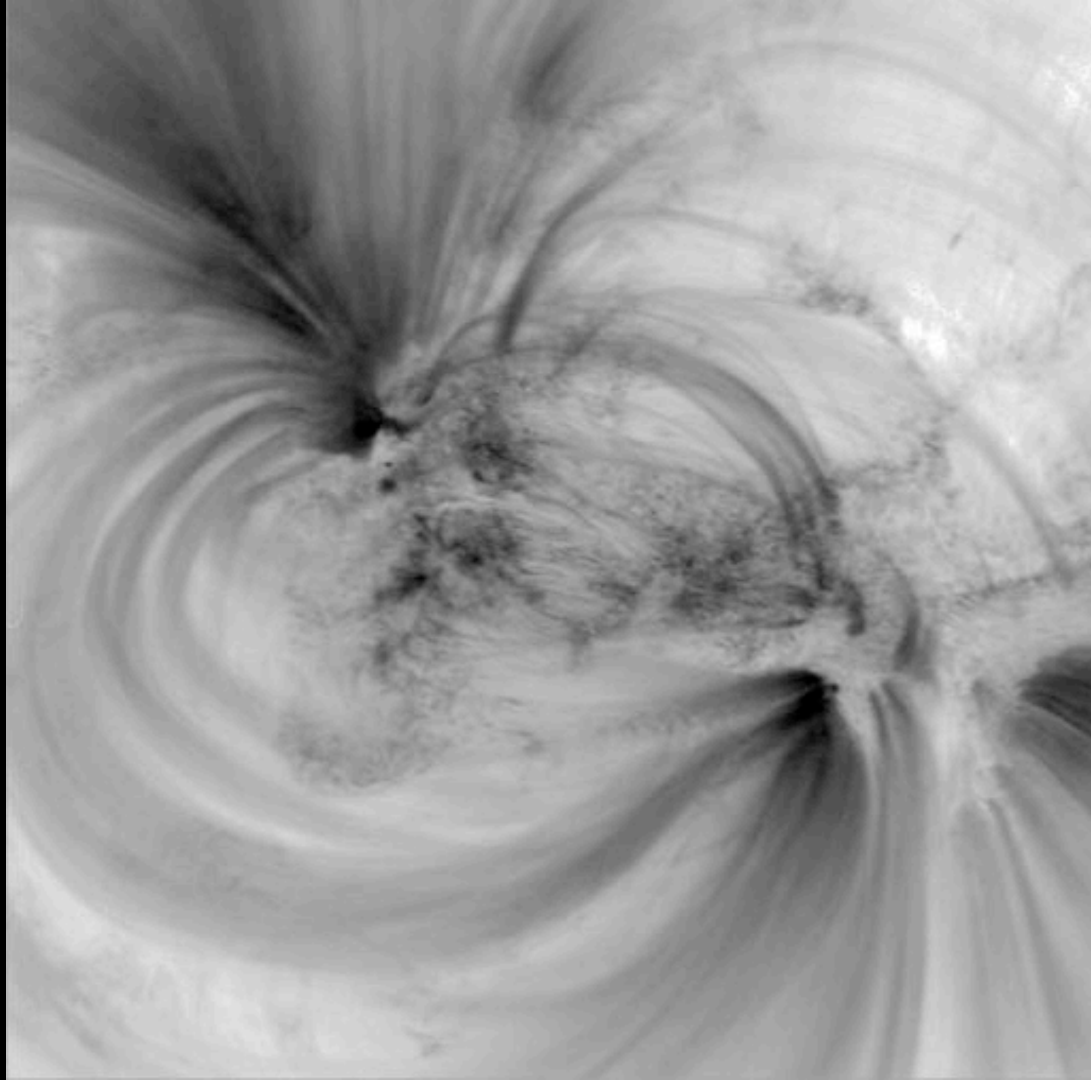


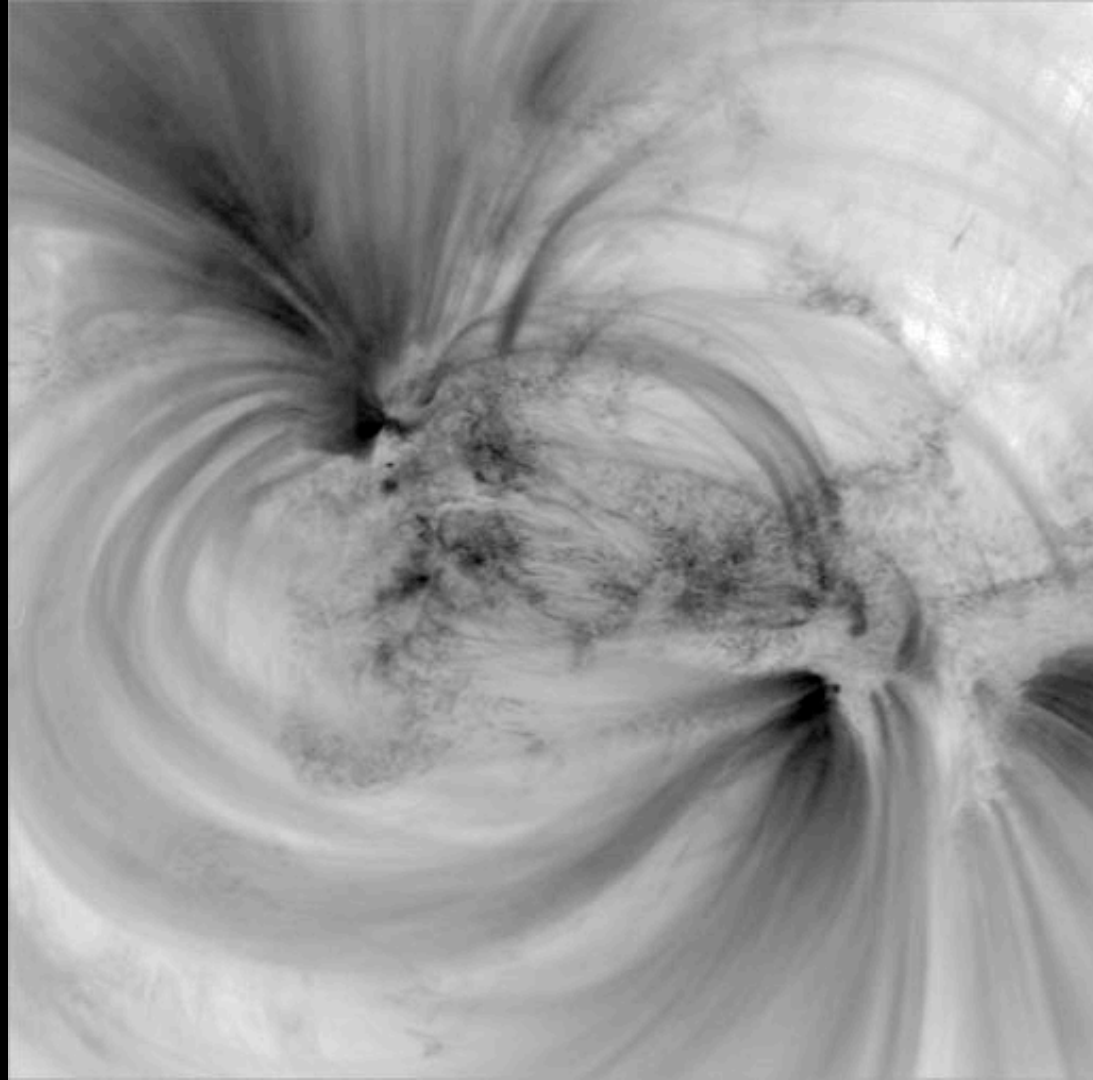
SDO/AIA  
171 Å



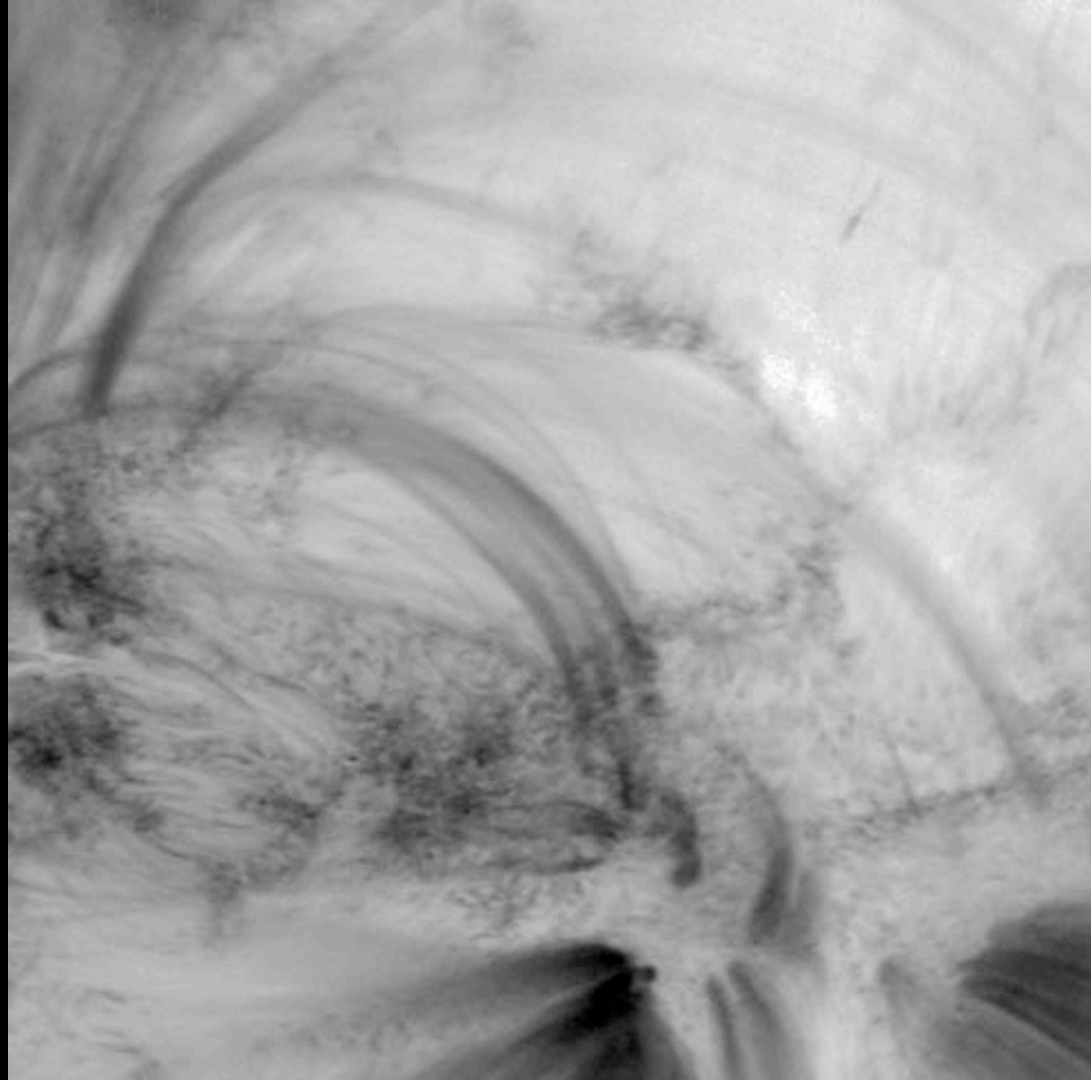
Hi-C 2.1  
172 Å











# Hi-C 2.1 – What makes this instrument work?

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HIGH SPATIAL RESOLUTION

HIGH TEMPORAL RESOLUTION

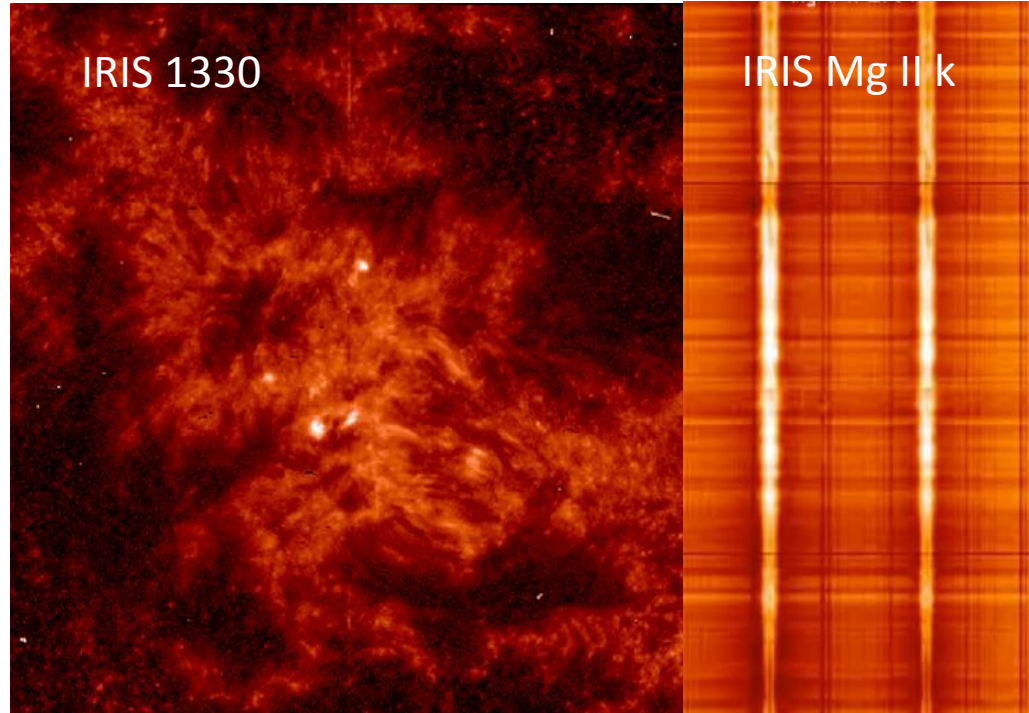
LOW NOISE CAMERA

COORDINATED DATA SETS

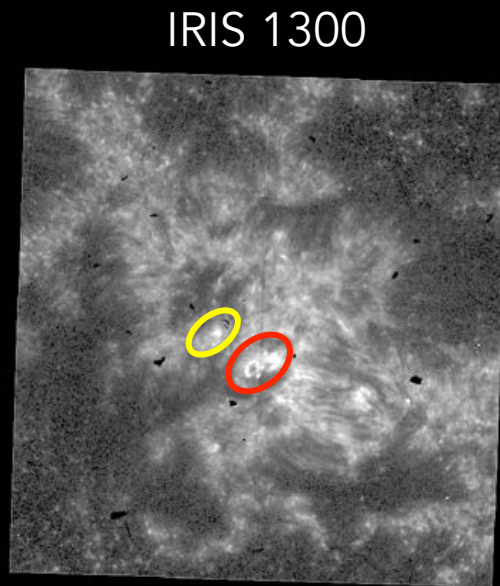
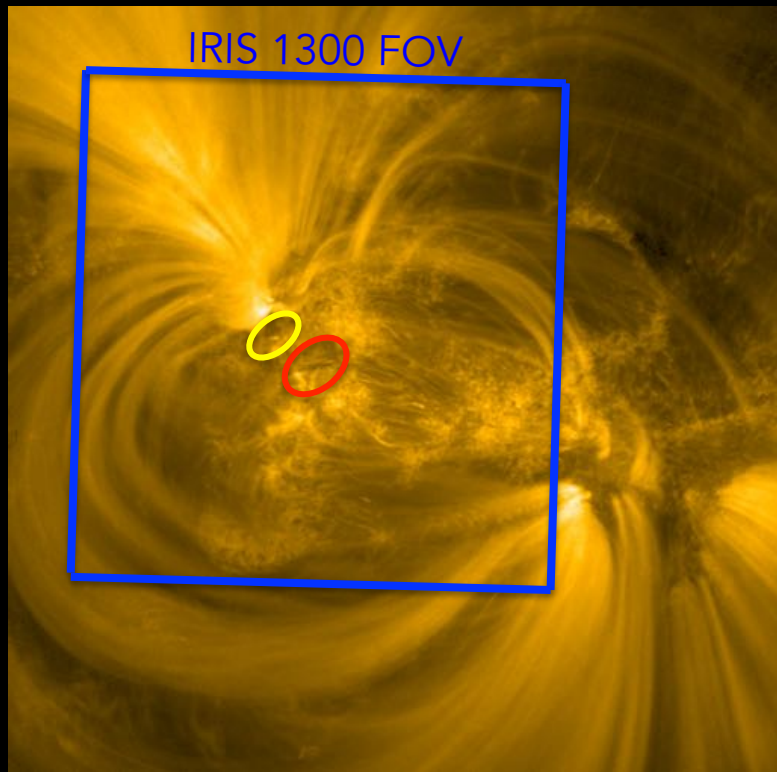
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# IRIS coordinated data

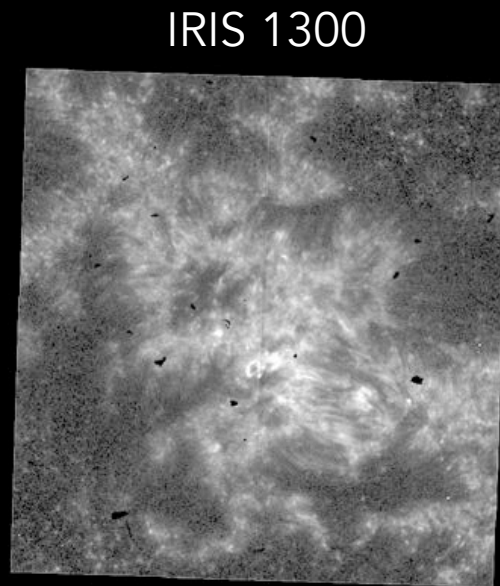
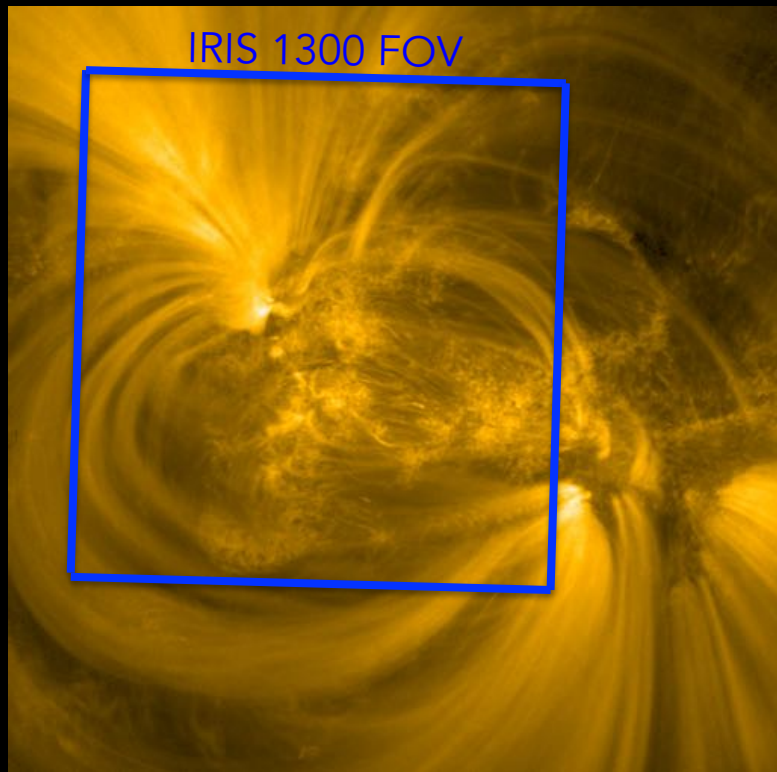
IRIS observations of a subset of the region at high resolution and spectra will be used to tie small features in the chromosphere to those in the corona.



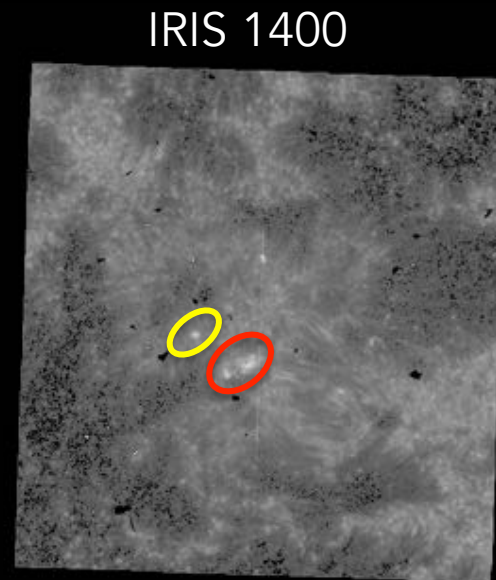
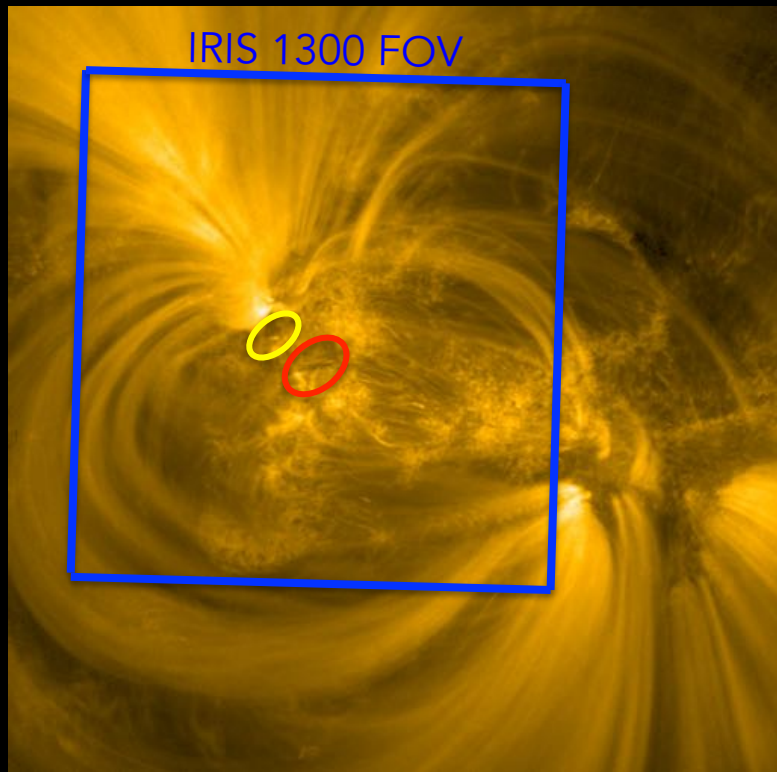
# IRIS coordinated data



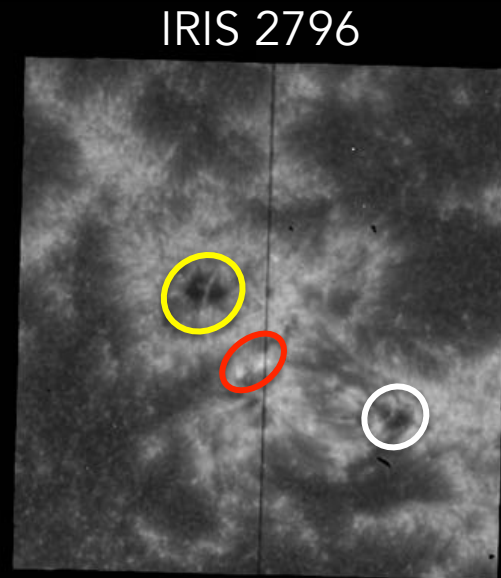
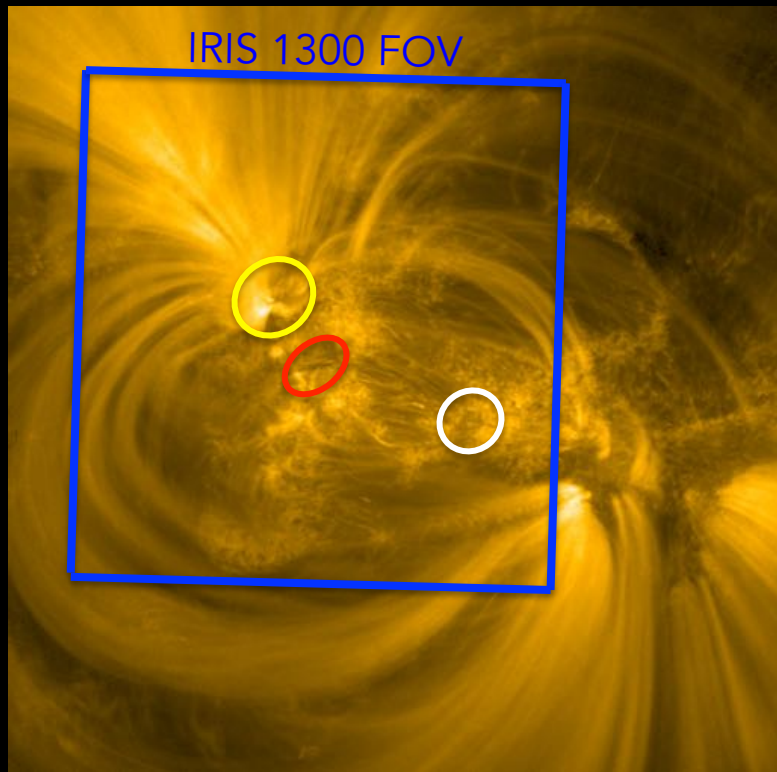
# IRIS coordinated data



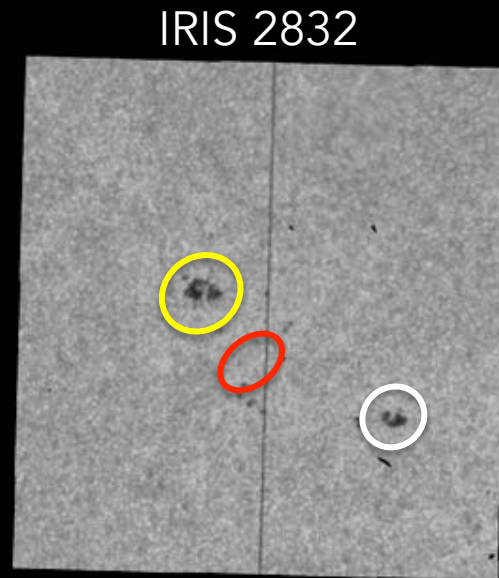
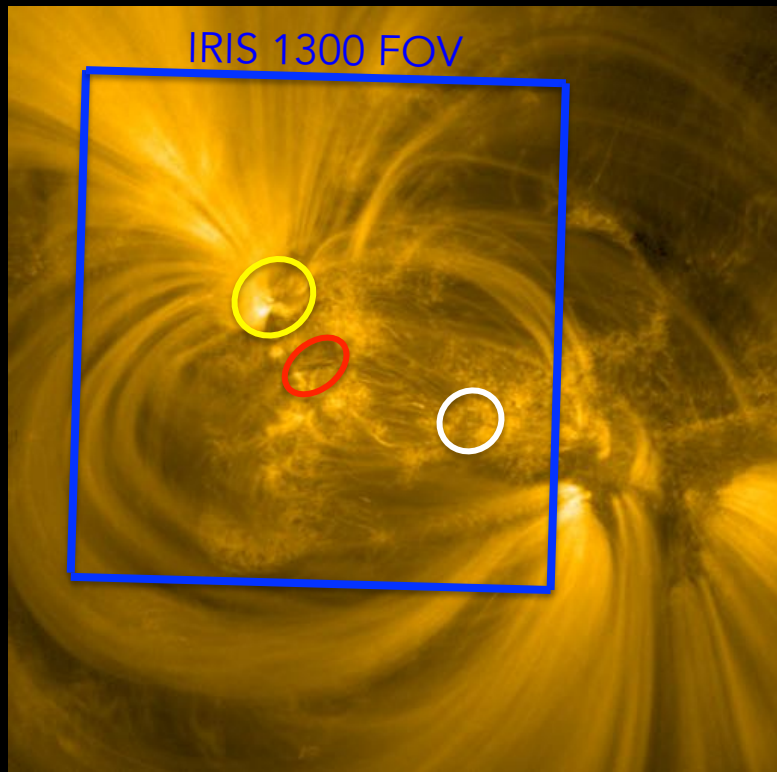
# IRIS coordinated data



# IRIS coordinated data

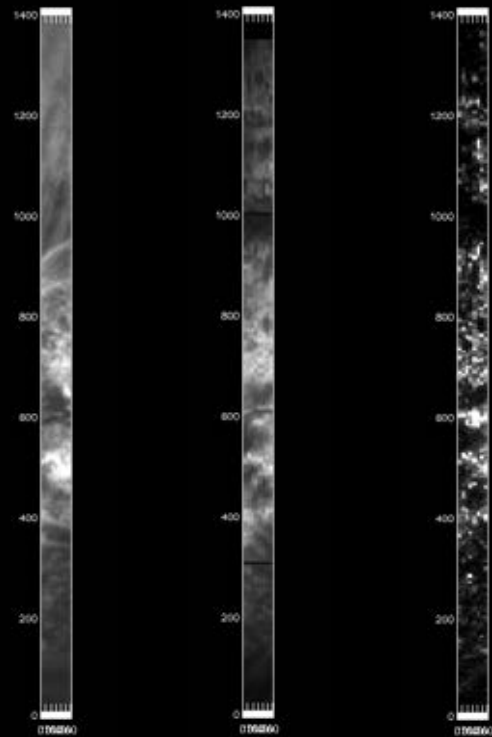
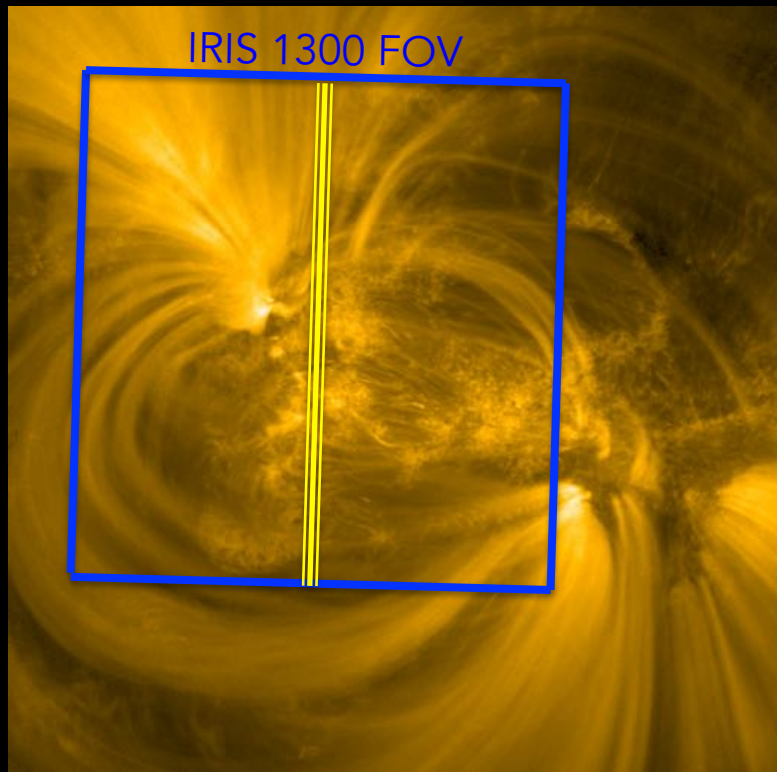


# IRIS coordinated data





# IRIS coordinated data



# Hinode coordinated data

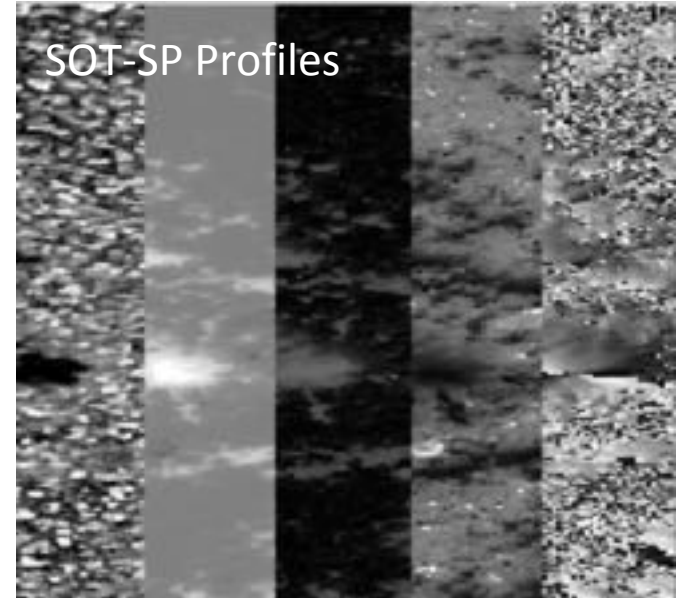
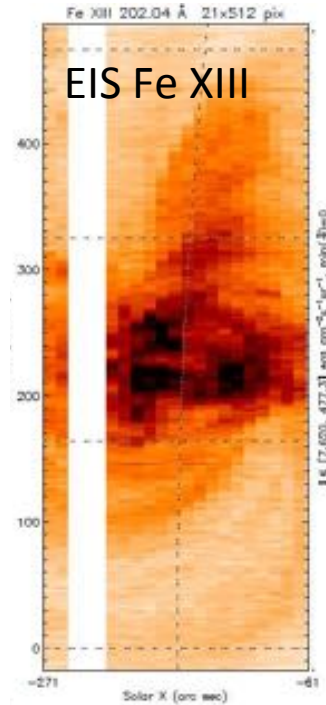
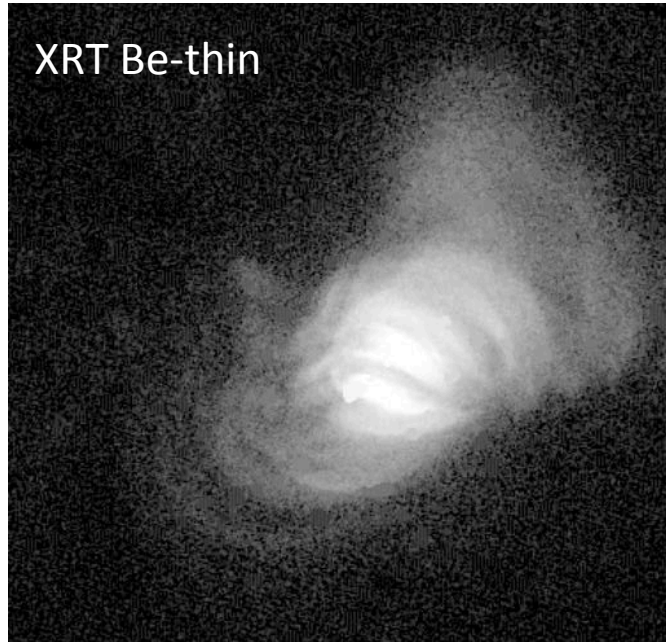
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All three Hinode instruments successfully captured the Hi-C 2.1 region.

- XRT provides coronal context of the movement of hot plasma in the upper atmosphere above the Hi-C features.
  - EIS provides narrowband spectra of the hot coronal loops thereby precisely measuring plasma flow properties.
  - SOT-SP provides underlying magnetic field information to high precision.
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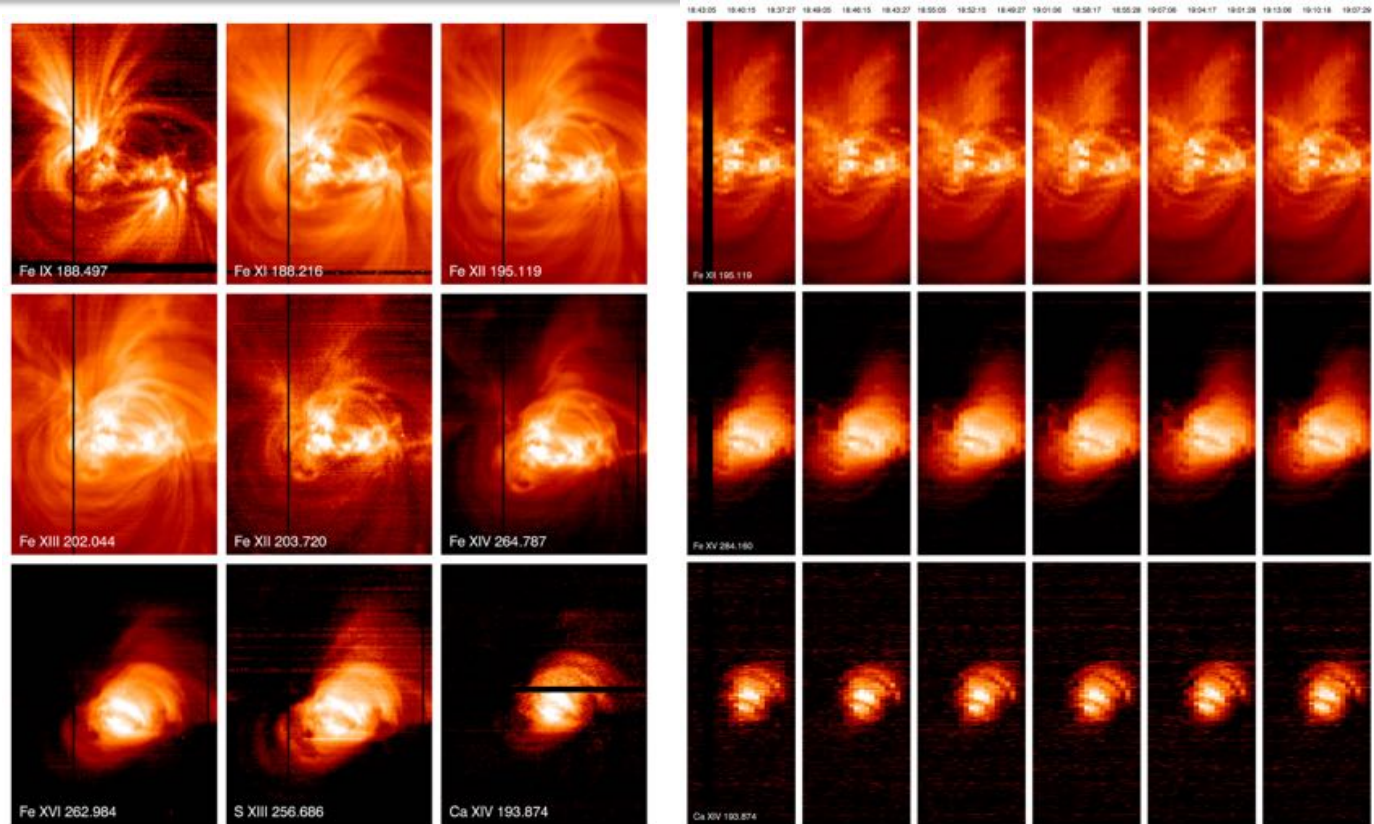
# Hinode coordinated data

All three Hinode instruments successfully captured the Hi-C 2.1 region.



# Hinode coordinated data

**EIS is BACK!**



# Science topics being pursued

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- Thin, stranded loops [width variations]
  - Flows between transition region, chromosphere, and corona
  - Spicules
  - Nano/microflares
  - Moss/Plage brightenings
  - Flows along loops
  - Waves
  - Mini-jets
  - Etc.
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# Additional Coordinated Data Sets

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- NuSTAR
- BBSO
- Owens Valley
- ~SST

\*\* Special thanks for assisting with the coordinations goes out to:

L. Glesener,  
K. Reardon,  
B. Chen,  
Y. Chai,  
N. Karuda,  
P. Antolin,  
J. Leenaarts,  
Gregal Visers

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# AGU plug

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Add AGU session approved for highlighting sounding rocket results.

Hi-C 2.1 science results expected to be presented in this session!



**FALL MEETING**

Washington, D.C. | 10-14 Dec 2018

*Thanks, and stay tuned....*

