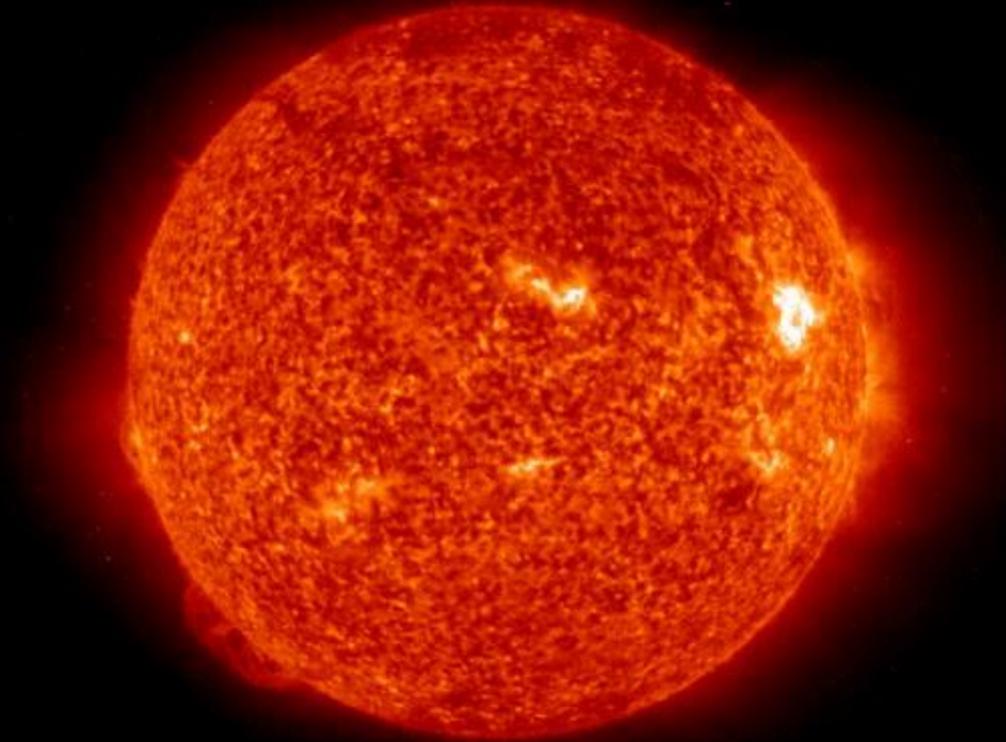


# The Sun



A cool animation of the Sun can be found on this link, click and scan down.

[http://www.boston.com/bigpicture/2008/10/the\\_sun.html](http://www.boston.com/bigpicture/2008/10/the_sun.html)

An animation of the sun, seen by NASA's Extreme ultraviolet Imaging Telescope (EIT) over the course of 6 days, starting June 27, 2005. (Courtesy of SOHO/EIT consortium) #

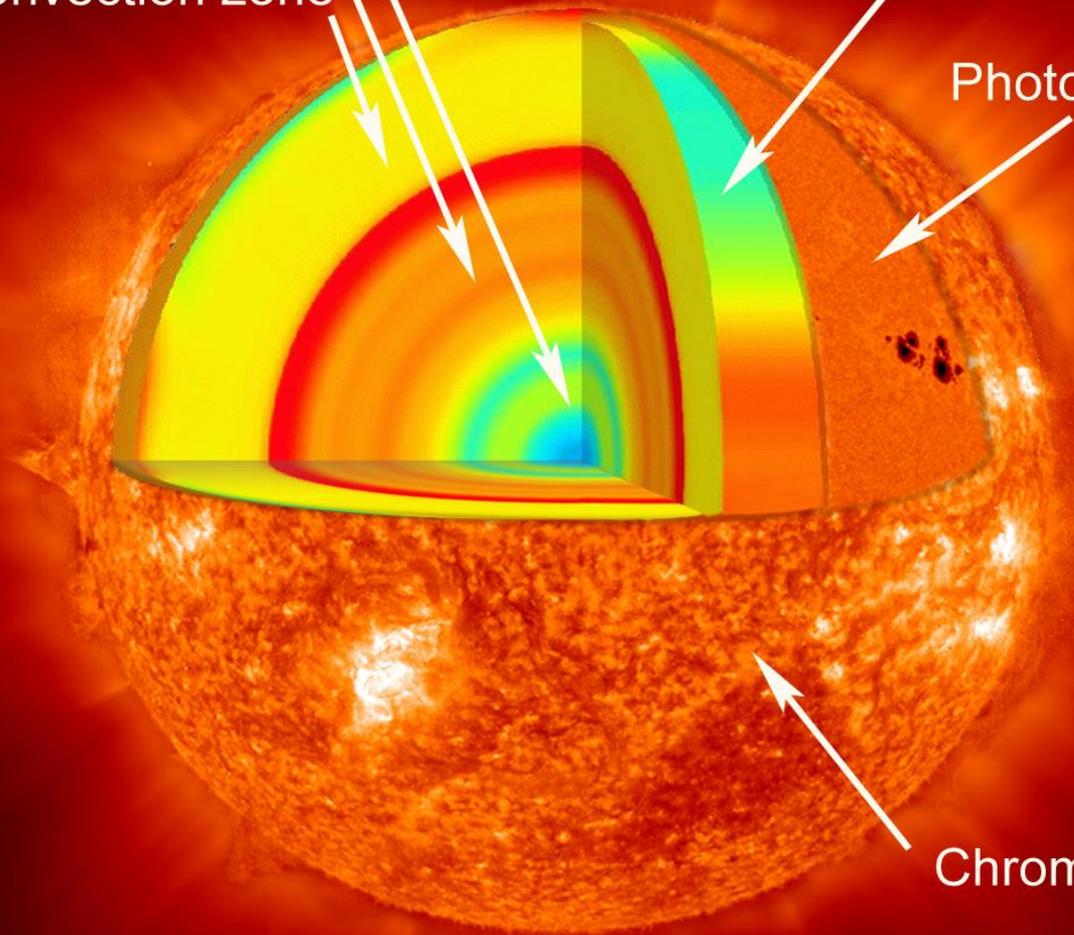
**Internal structure:**  
inner core  
radiative zone  
convection zone

Subsurface flows

Photosphere

Chromosphere

Corona



# Nuclear Fusion

- The sun is a large ball of burning fuels
- Hydrogen atoms join together to form Helium
- Only happens w/ extreme heat and pressure.
- About 15 million degrees Celsius

# Core

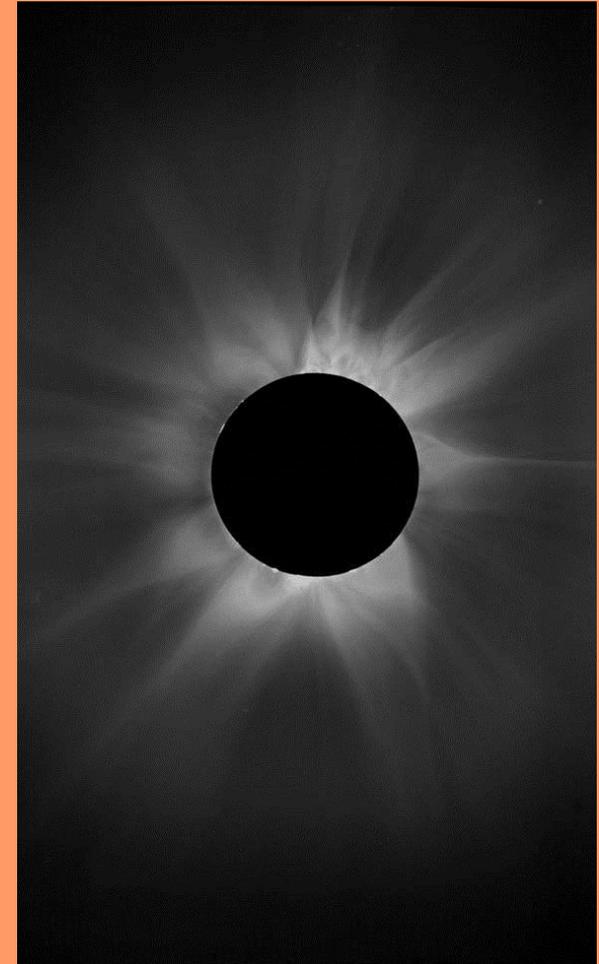
- Center of the Sun
- Hottest part of the sun

# How long will it burn?

- Should burn for 10 billion years.
- It is only about 5 billion years old now.

# Layers of Sun's Atmosphere

- (Gases surrounding the Sun)
- 3 layers
- Photosphere
- Chromosphere
- Corona



The total solar eclipse of February 16, 1980 was photographed from Palem, India, by a research team from the High Altitude Observatory of the National Center for Atmospheric Research.

[http://www.boston.com/bigpicture/2008/10/the\\_sun.html](http://www.boston.com/bigpicture/2008/10/the_sun.html)

# Photosphere

- Inner layer of atmosphere
- What makes the light
- Most pictures show the Photosphere

# Chromosphere

- Middle layer of the atmosphere.
- Only seen at the beginning and end of a total solar eclipse – reddish glow.

<http://www.esa.int/esa-mm/mmg.pl?collection=Space+Science&type=I>  
European Space Agency Multimedia Gallery



# Corona (Crown)

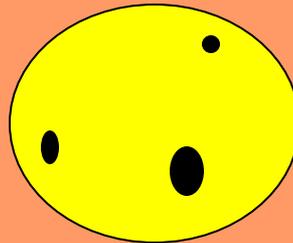
- Outer layer
- Only seen during a total solar eclipse.
- Astronomers use special telescopes to see the corona.

# Solar Wind

- A stream of electrically charged particles sent into space from the sun's corona.
- Only seen from Earth as Auroras

# Sunspots

- Small, dark areas on the Sun.
- Areas of gas that are cooler than the gases around them
- Change every 10 to 11 years.



Near Solar Max - March 2001

Near Solar Min - January 2005



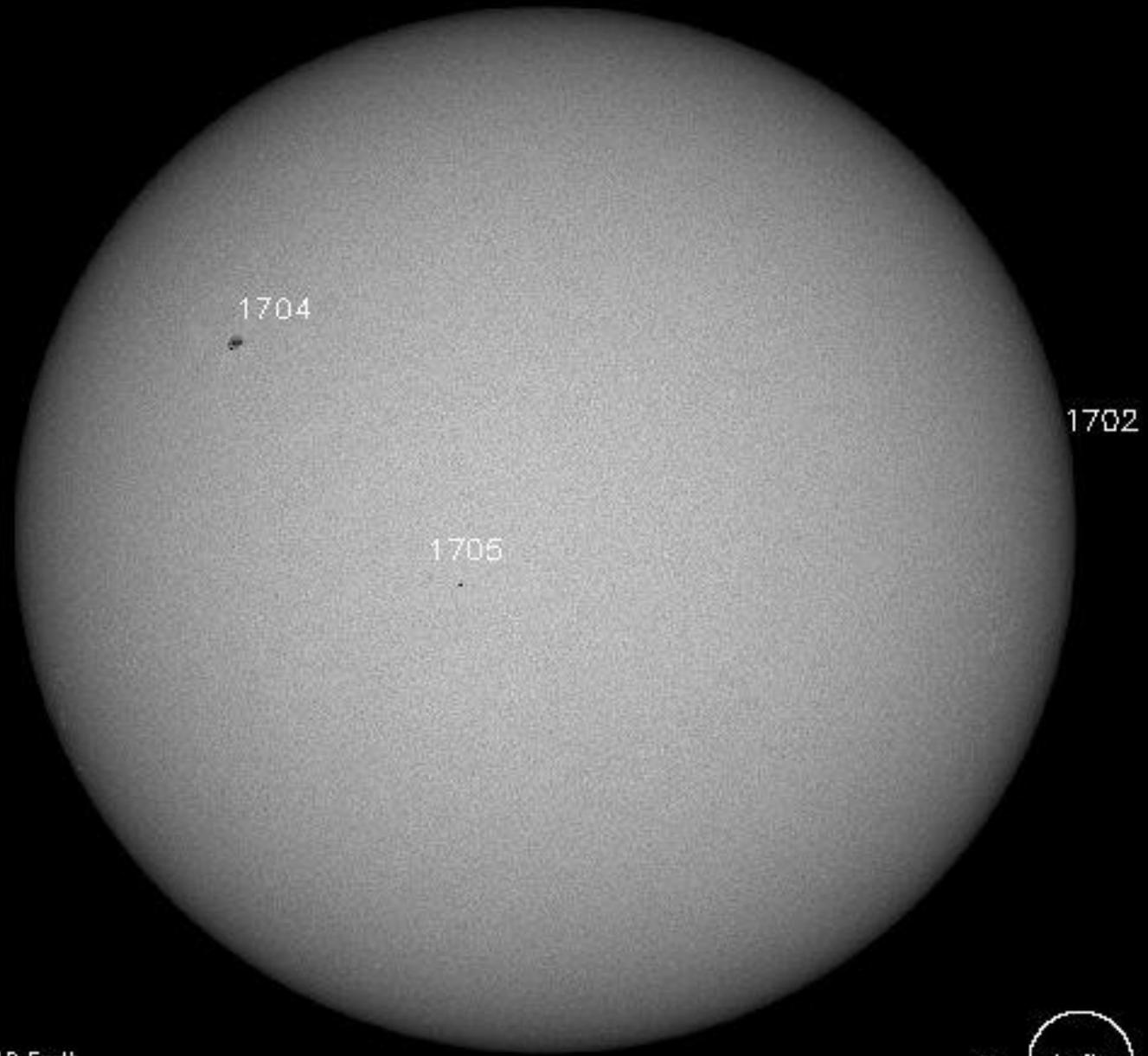
2001/03/29 09:36 UT



2005/01/07 09:50

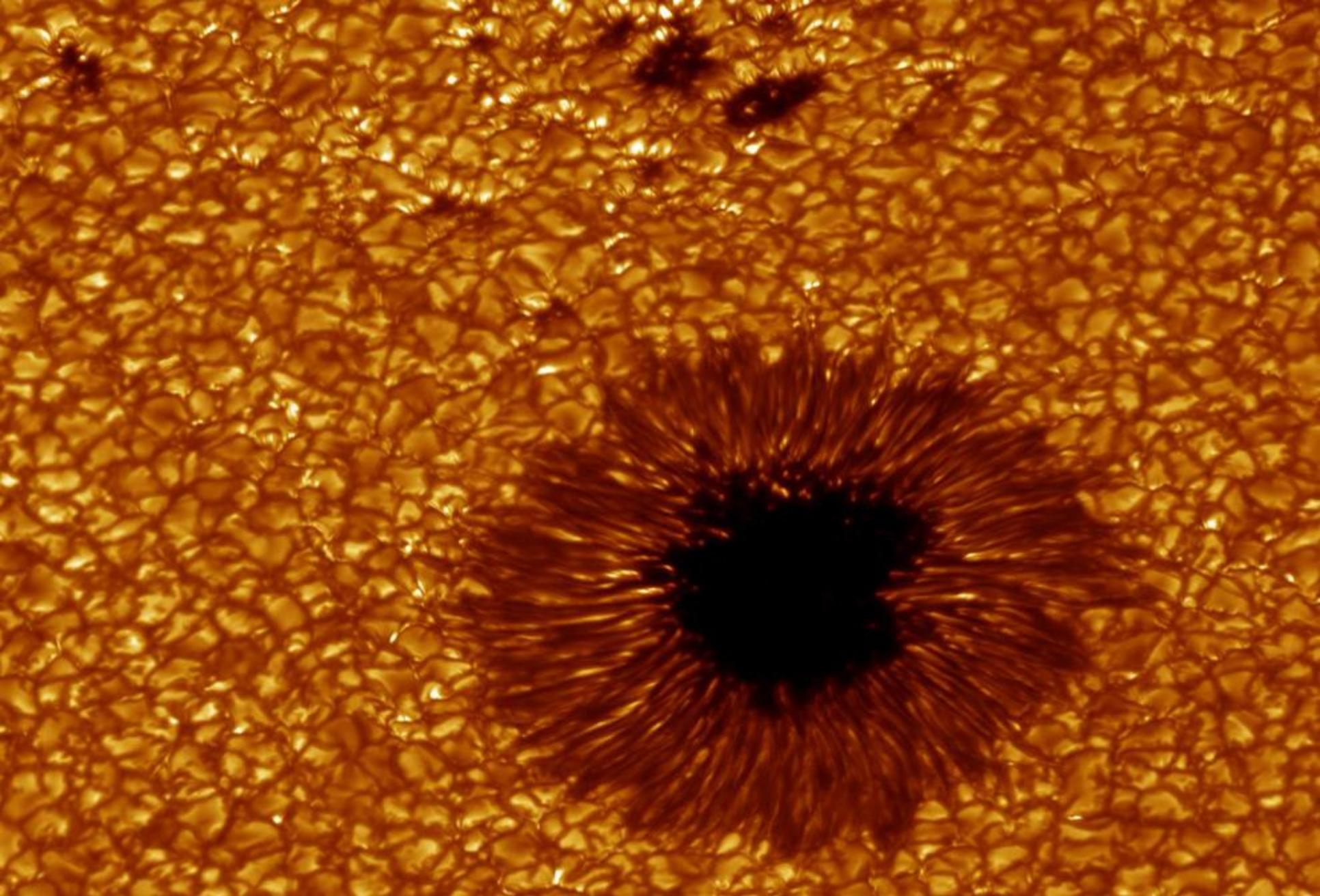
Images courtesy SOHO (NASA/ESA).

<http://www.windows.ucar.edu/tour/link=/>

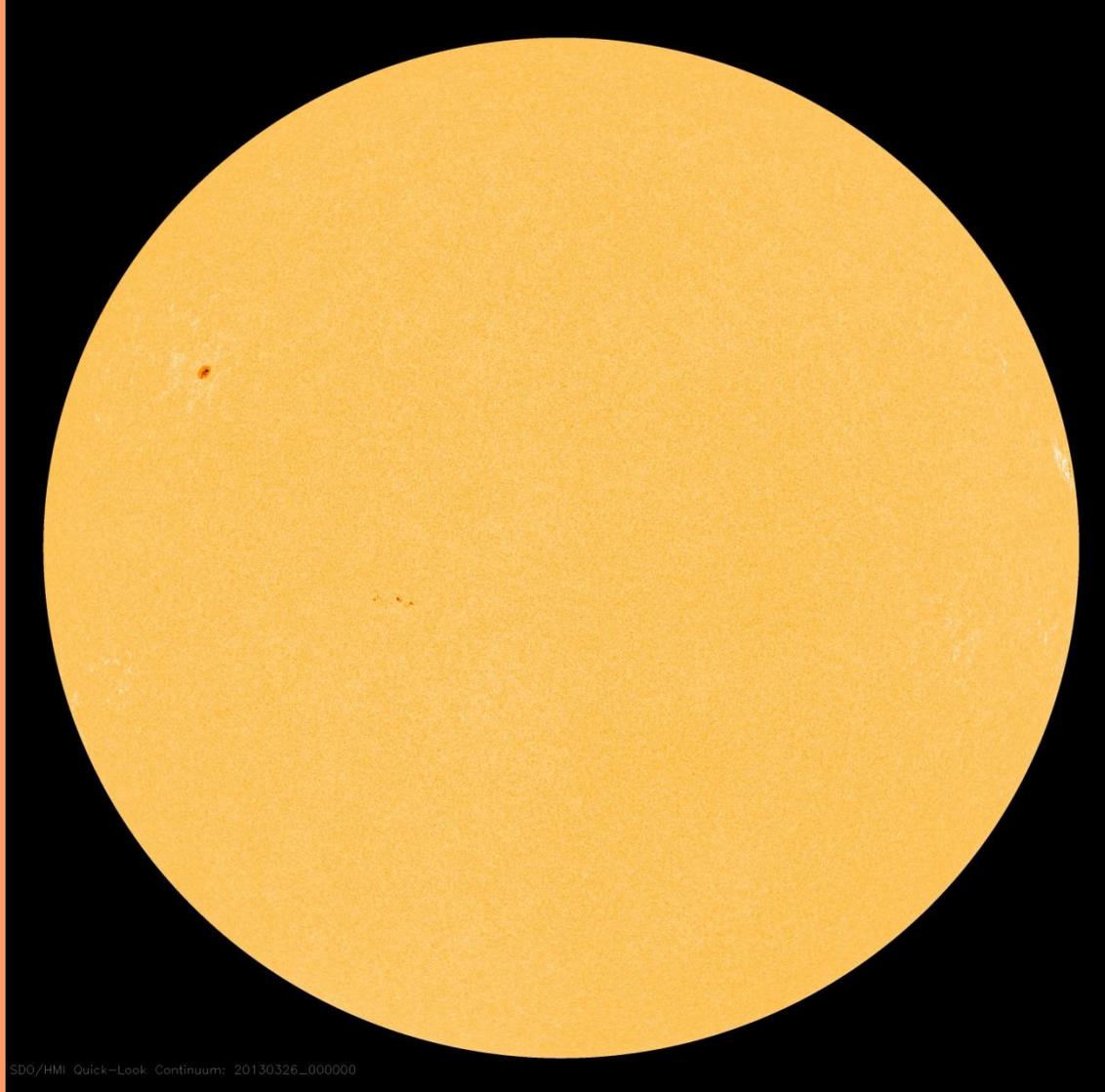


10 Earth



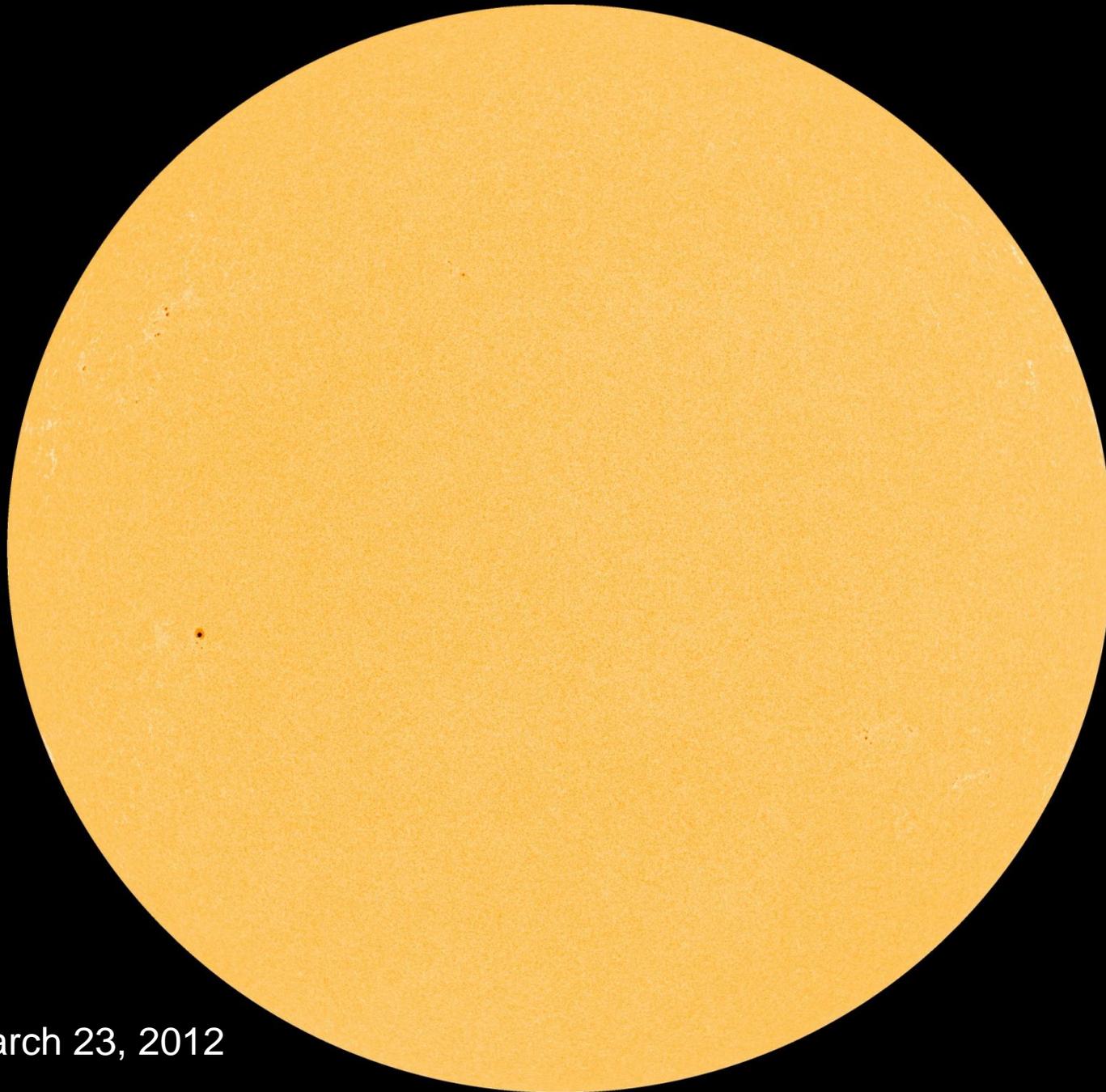


(Swedish 1-m Solar Telescope (SST) operated by the Royal Swedish Academy of Sciences, Göran Scharmer and Kai Langhans, ISP) # [http://www.boston.com/bigpicture/2008/10/the\\_sun.html](http://www.boston.com/bigpicture/2008/10/the_sun.html)



Sunspot picture taken of the Sun on Tuesday, March 26, 2013

<http://www.spaceweather.com/>

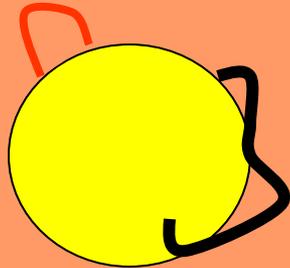


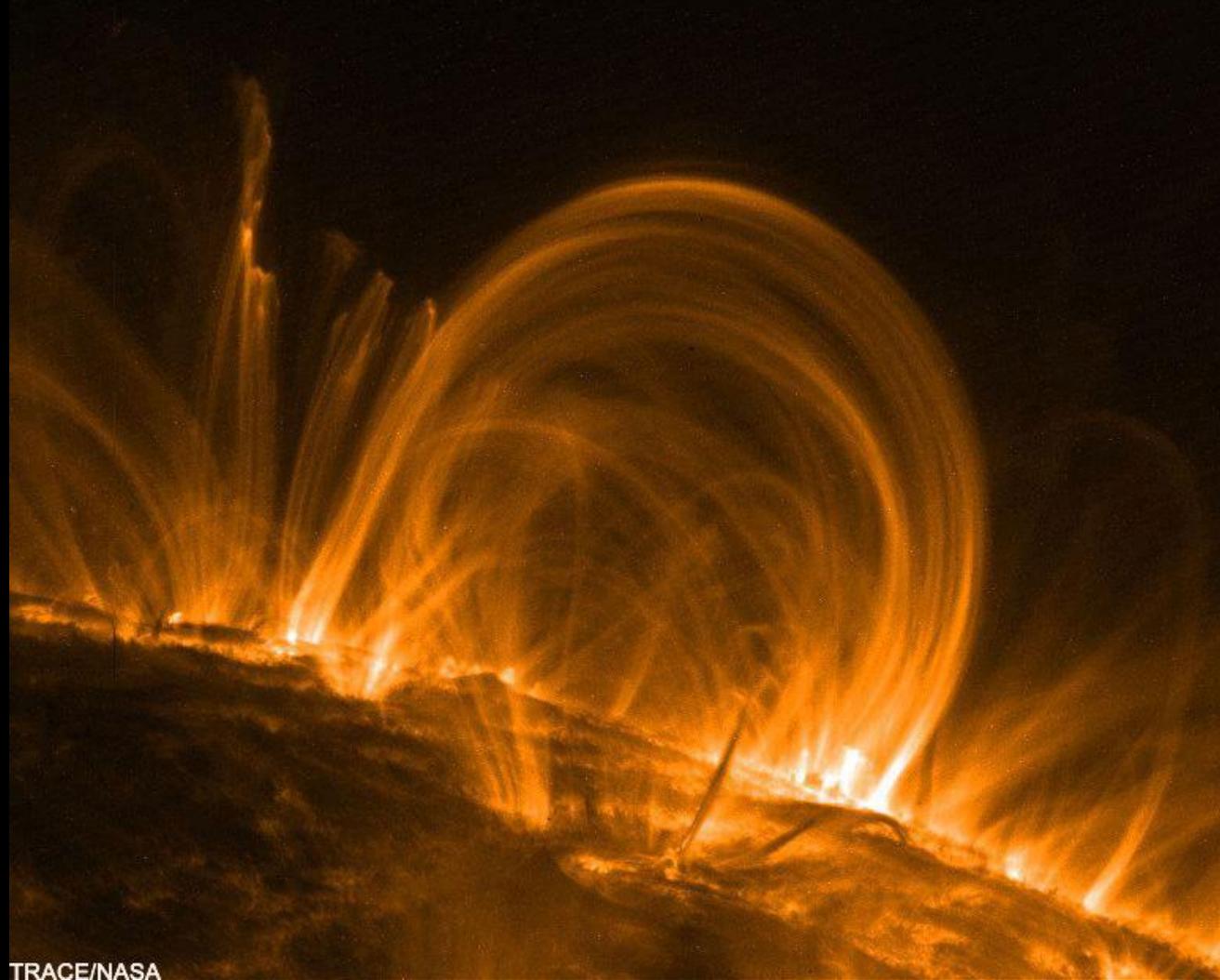
Sunspots

Friday, March 23, 2012

# Prominence

- Reddish loops of gas.
- Near Sunspots
- About 10,000 degrees C.

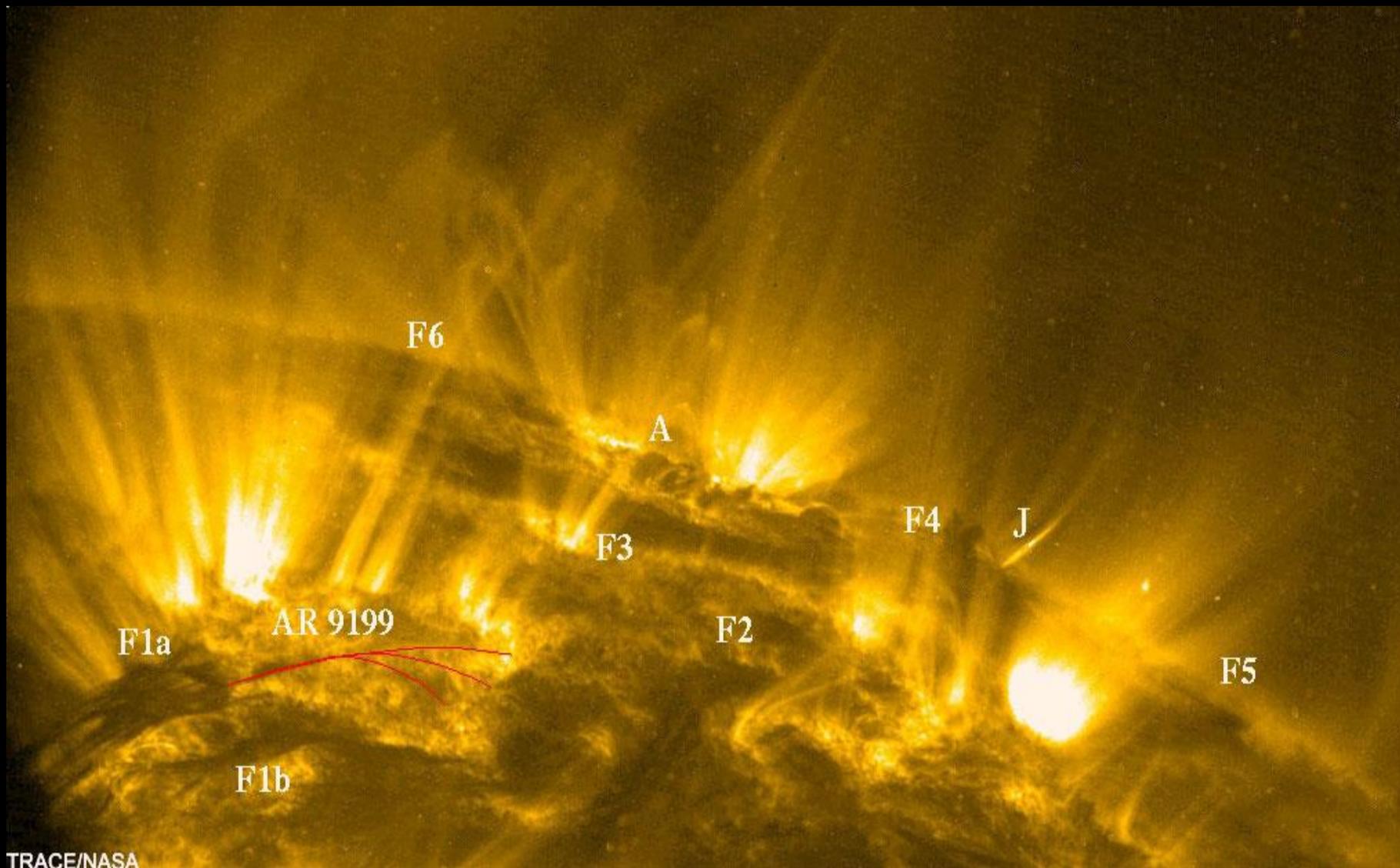




TRACE/NASA

# Solar Flare

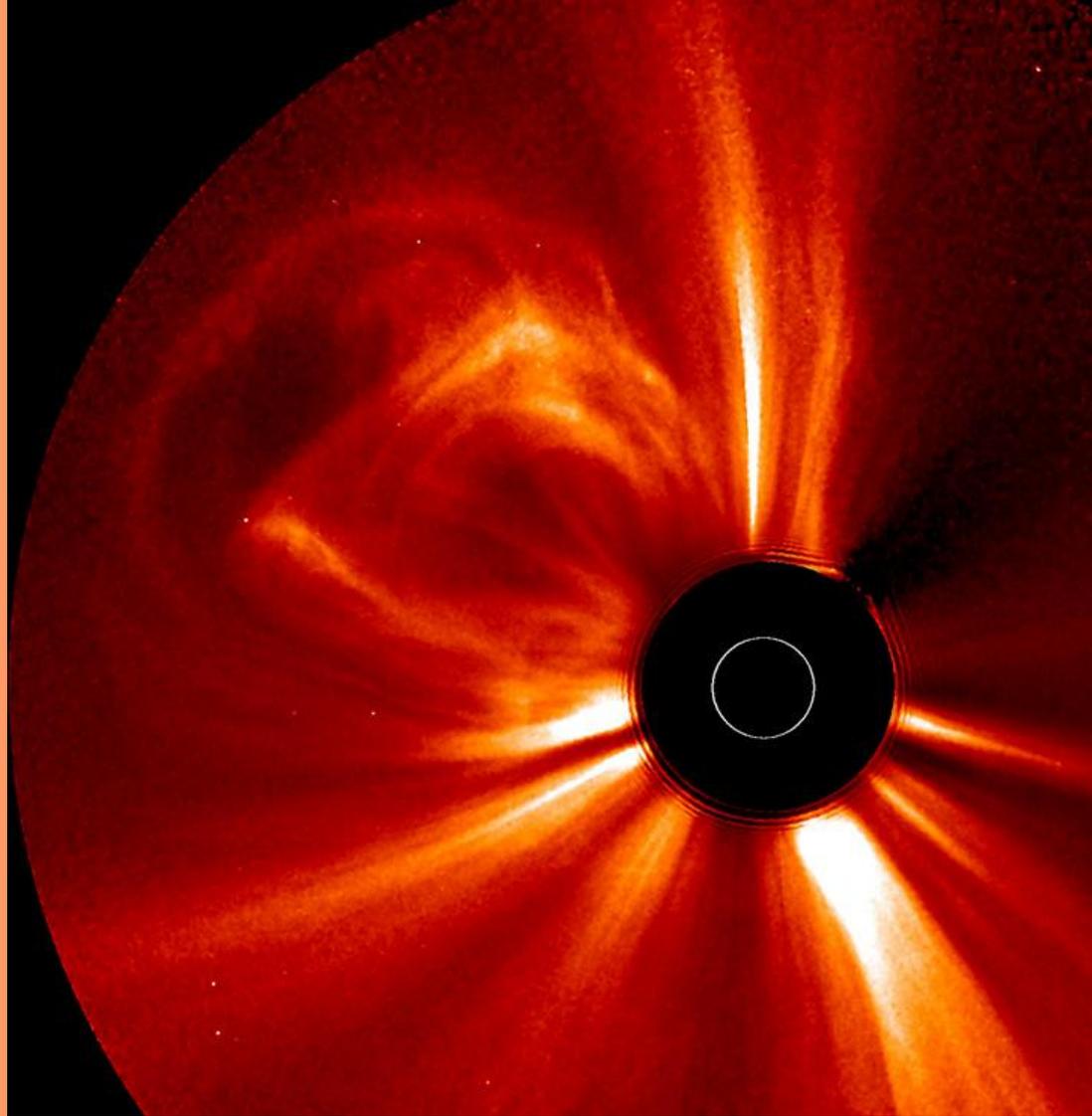
- Several prominences connect  
– large energy
- Millions of degrees C
- Hydrogen Gas explodes into  
Space
- Magnetic storms reach Earth  
= electrical problems.



TRACE/NASA

TRACE 171Å image of an erupting solar filament above Active Region 9077 on July 19, 2000  
[http://www.boston.com/bigpicture/2008/10/the\\_sun.html](http://www.boston.com/bigpicture/2008/10/the_sun.html)

The Sun blasted out a broad and sizeable coronal mass ejection (CME), and then followed that with a very slowly developing, narrow eruption that went just about due north (Mar. 17-18, 2013). The images were taken by the STEREO (Ahead) spacecraft. The still image shows the larger, bulbous front of the expanding CME. The Sun (here represented by the small white circle) is blocked out by the larger occulting disk so that the faint features in the Sun's corona can be imaged.



<http://sohowww.nascom.nasa.gov/>