

Modern Cosmology

Martin Buoncristiani
University of the Third Age
Session 13

A Long Time Ago in Galaxies Far, Far Away...

Dr. Amanda Bauer
Super Science Fellow
Australian Astronomical Observatory

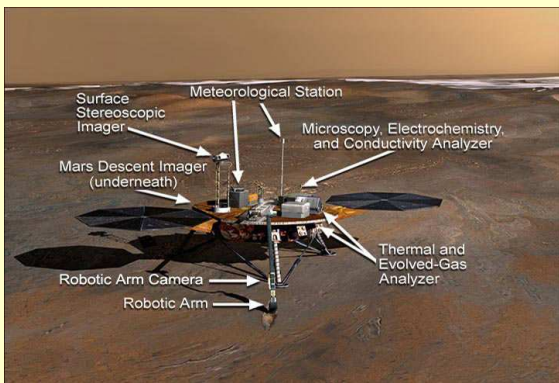


6pm, Thursday
When: 13 September, 2012
Where: Lecture Theater S3

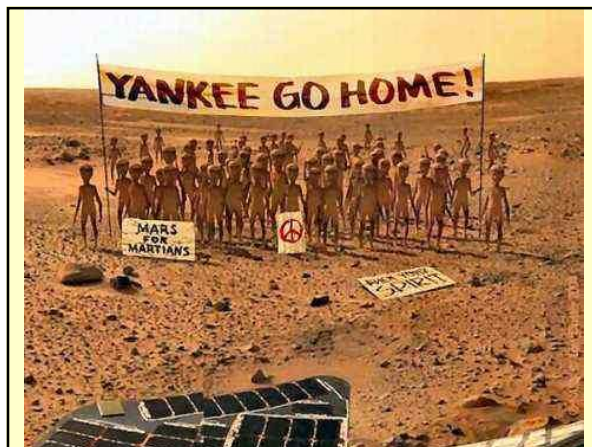
News from Mt. Burnett Observatory



... other News

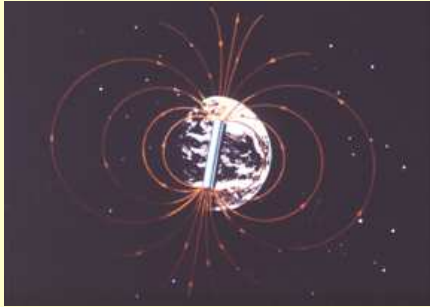


Surface Stereoscopic Imager
Mars Descent Imager (underneath)
Robotic Arm Camera
Robotic Arm
Meteorological Station
Microscopy, Electrochemistry, and Conductivity Analyzer
Thermal and Evolved-Gas Analyzer

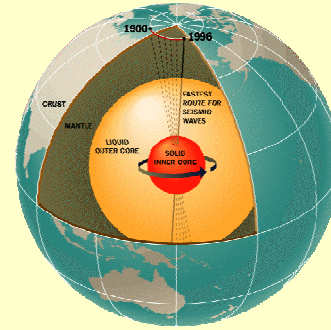


Where shall we go next?

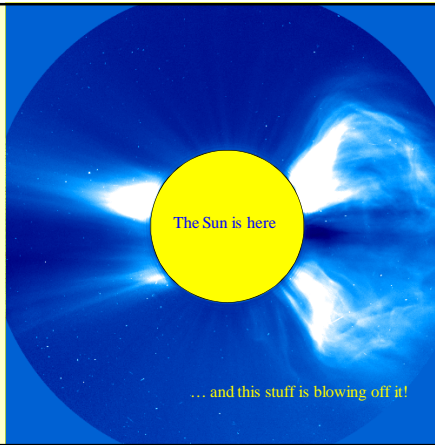
Earth as a Magnet



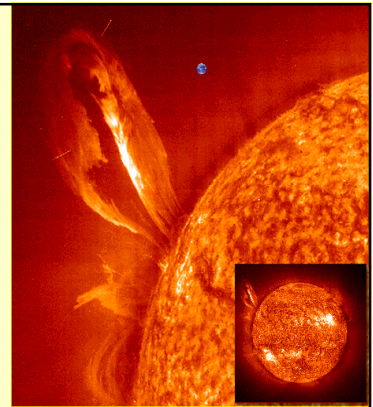
Why is this magnetic field important to us?



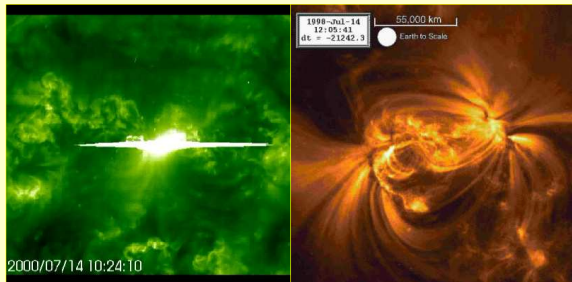
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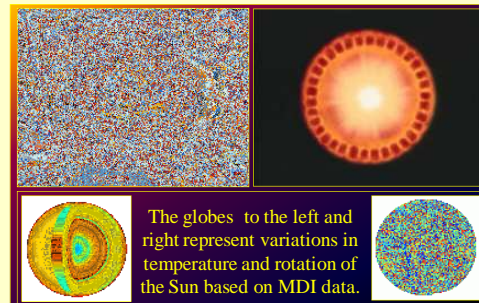
Sometimes
we think
the sun is
a quiet
giant



Solar Flares



Sun's Internal Structure



Magnetic Storms Sources


- [SolarWind](#)
- [Sun Spot](#)
- [LongWavelength](#)
- [SolarMax195X](#)
- [Big Flare](#)



A diagram showing magnetic field lines (red and purple) looping around the Sun (yellow sphere at the bottom). Arrows indicate the direction of the field lines. A white line represents the Earth's orbit.

Coronal Mass Ejections

- [CME](#)
- [Activity in Corona](#)
- [Earth Auroras](#)
- [Sparkles](#)



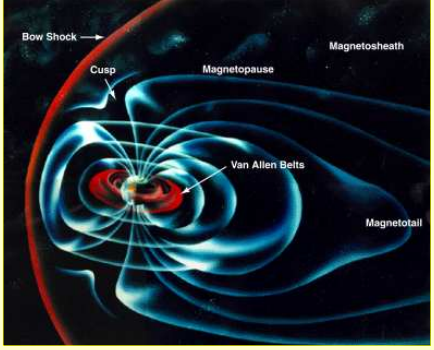
A photograph showing a coronal mass ejection (CME) as a bright, expanding cloud of plasma and magnetic field erupting from the Sun's corona. The Earth is visible in the background.

What does the Sun's Activity do to Earth



A photograph showing the Earth's magnetosphere, a region of space dominated by the magnetic field of the Earth, extending into the solar wind. The magnetosphere is shown as a blue, glowing structure surrounding the Earth.

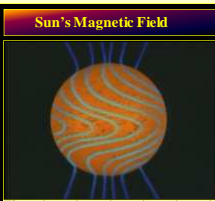
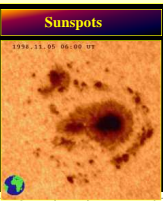
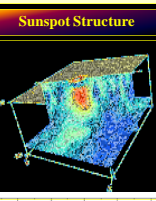
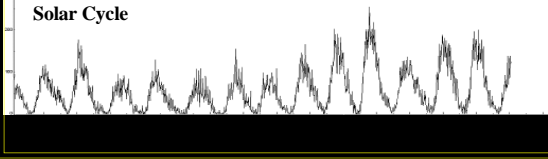
Earth's Magnetosphere Blown by the Solar Wind



A diagram illustrating the Earth's magnetosphere being compressed and distorted by the solar wind. Labels include: Bow Shock, Cusp, Magnetopause, Magnetosheath, Van Allen Belts, and Magnetotail.

•[CME Impact](#)

Sunspots

 <p>Sun's Magnetic Field</p>	 <p>Sunspots</p>	 <p>Sunspot Structure</p>
 <p>Solar Cycle</p>		

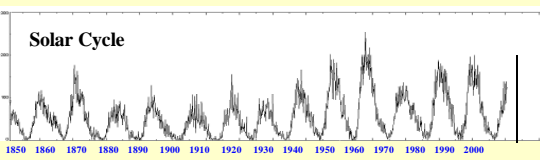
The Sun's Magnetic Field: A diagram showing the Sun's magnetic field lines as blue loops around the Sun.

Sunspots: A photograph of the Sun's surface showing dark sunspots. A small Earth is shown for scale.


Sunspot Structure: A 3D diagram showing the structure of a sunspot, including the umbra and penumbra.

Solar Cycle: A line graph showing the number of sunspots over time, with a clear periodicity of approximately 11 years.

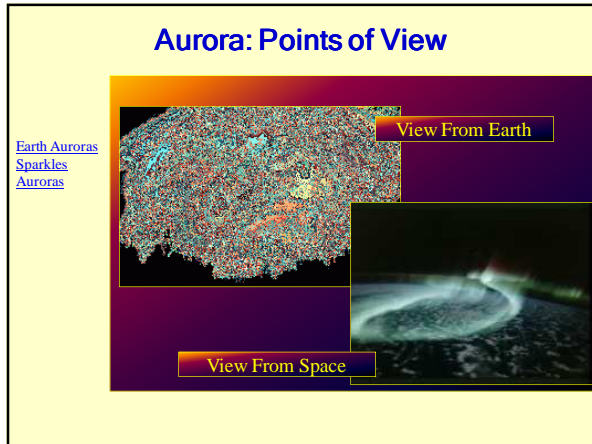
The Sun's Activity Changes in Cycles



A line graph showing the solar cycle, with the number of sunspots plotted against time from 1850 to 2000. The graph shows a clear periodicity of approximately 11 years.

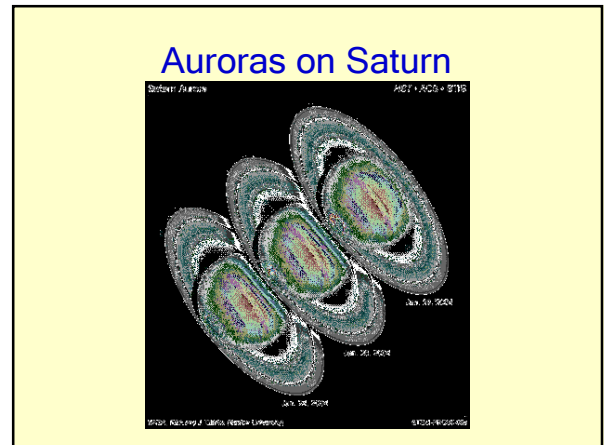


A small image of a sunspot.



What is Needed to have an Aurora?

- A magnetic field
- And an atmosphere.



The Unquiet Sun

- [SolarWind](#)
- [Sun Spot](#)
- [Sun Spot Detail](#)
- [LongWavelength](#)
- [BigFlare](#)
- [SolarMax195X](#)
- [CME Impact](#)
- [Earth Aurora](#)
- [Sparkles](#)
- [Auroras](#)

Do you know this woman?



Hedy Lamarr was a famous actress.

But she was also an engineer and during World War II invented a decoding machine. Her idea is still in use today.

