

Our Dynamic Sun



Dr Helen Mason

University of
Cambridge

Total Eclipse of the Sun

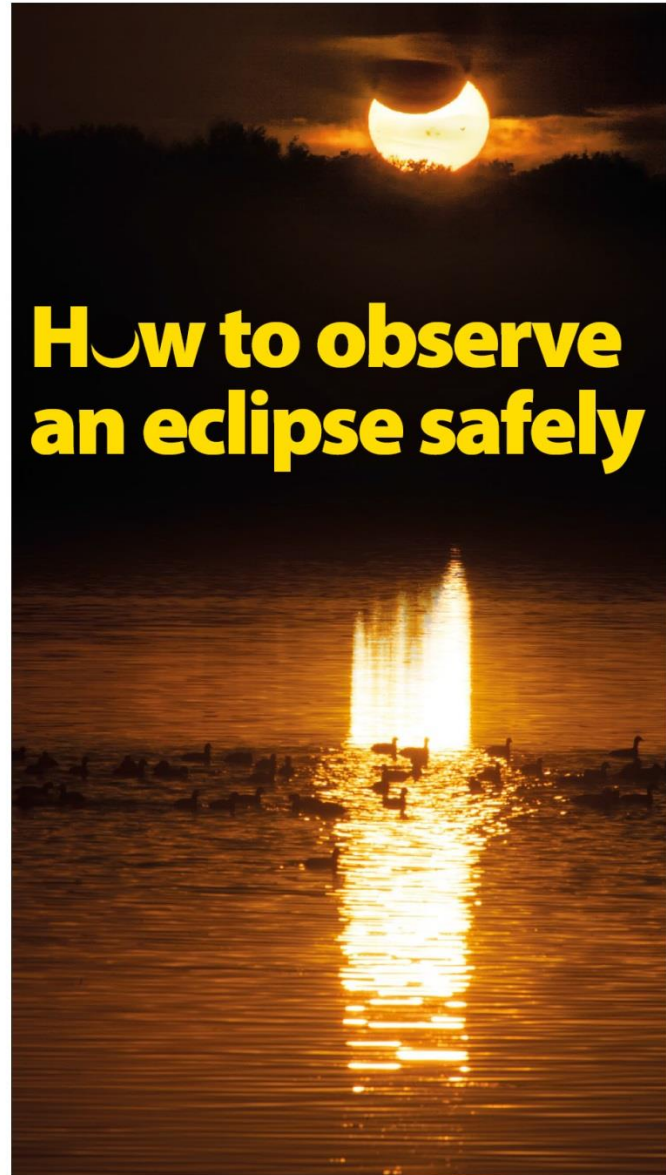


Solar Eclipse 2015 – UK leaflet

RAS: Sheila Kanani <sk@ras.org.uk>



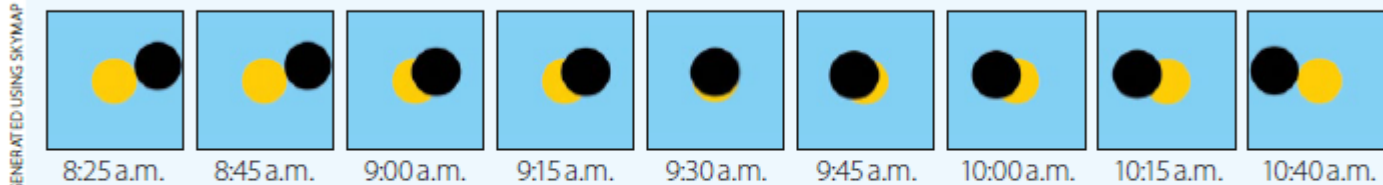
*Advancing
Astronomy and
Geophysics*



https://www.ras.org.uk/images/solar_eclipse_leaflet.pdf

What will we see in the UK?

From London



These diagrams show how the eclipse progresses as the Moon moves from right to left across the Sun, as viewed from London. Timings are approximate.

Colanders

By far the simplest way to view an eclipse is to use an item you normally find in the kitchen: a colander. Stand with your back to the Sun and hold the colander in one hand and a piece of paper in the other. Hold the colander between the Sun and the paper and watch as you safely observe many images of the eclipse on one piece of paper!



Safe Solar observations



Sunspotter

simple projection of the Sun and sunspots

H-alpha filter – Lee Macdonald
Prominence on limb



Safe Solar observations

Photo by Ninian Boyle
23rd April 2013



Solar telescope



The Sun, our star

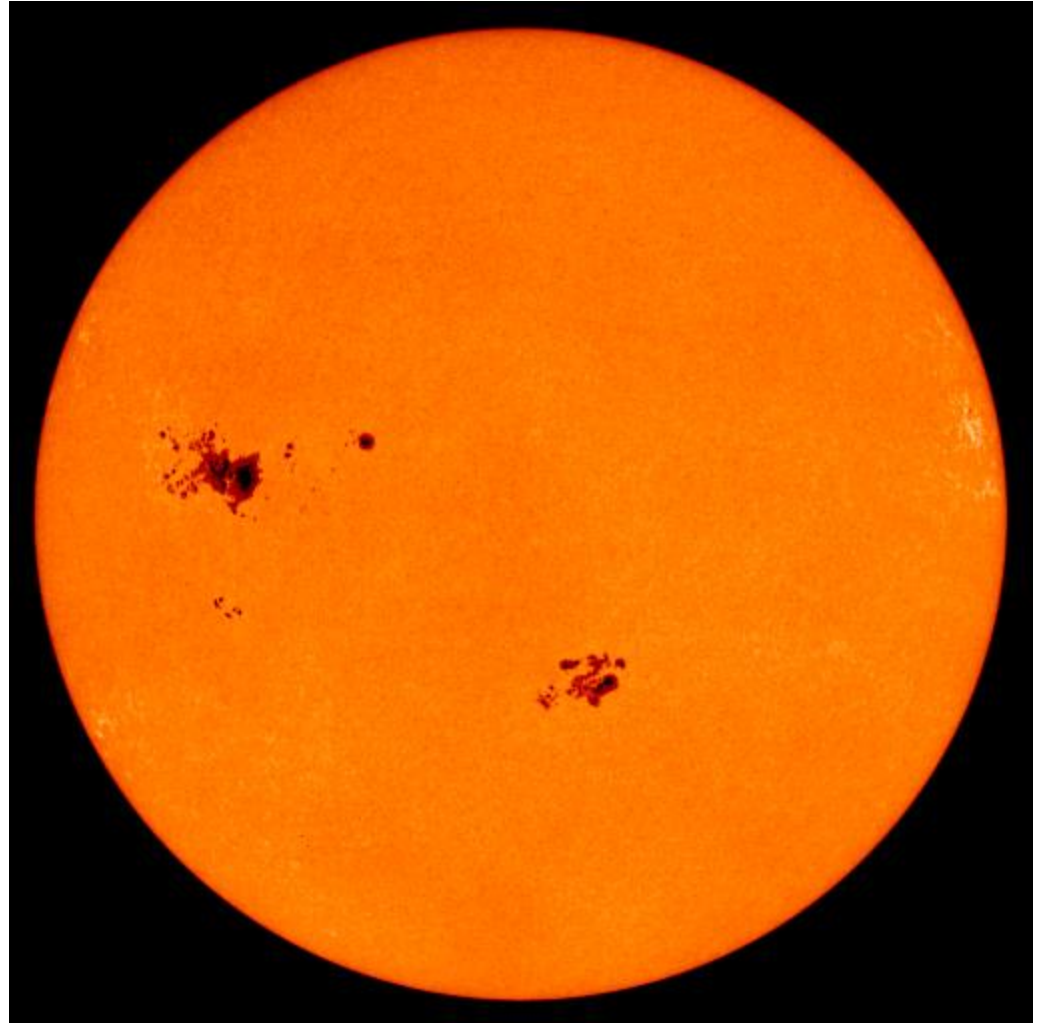
- *A Middle Aged Star*
- *Our Energy Source*

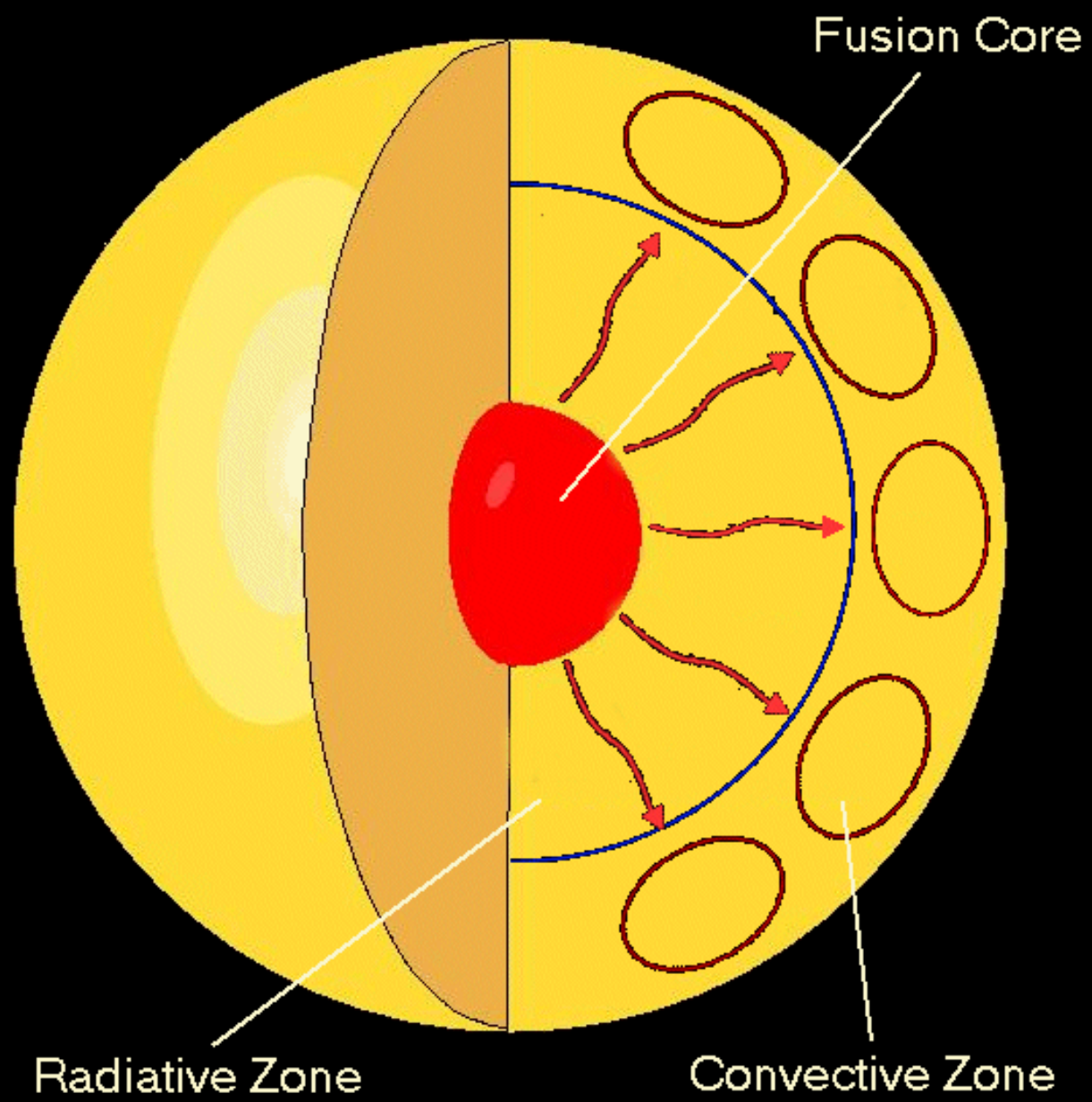
700,000 km radius

150 million km away

Mass 2×10^{30} kg

Temperature 5780 °C
(on surface)





Large Sunspot Group

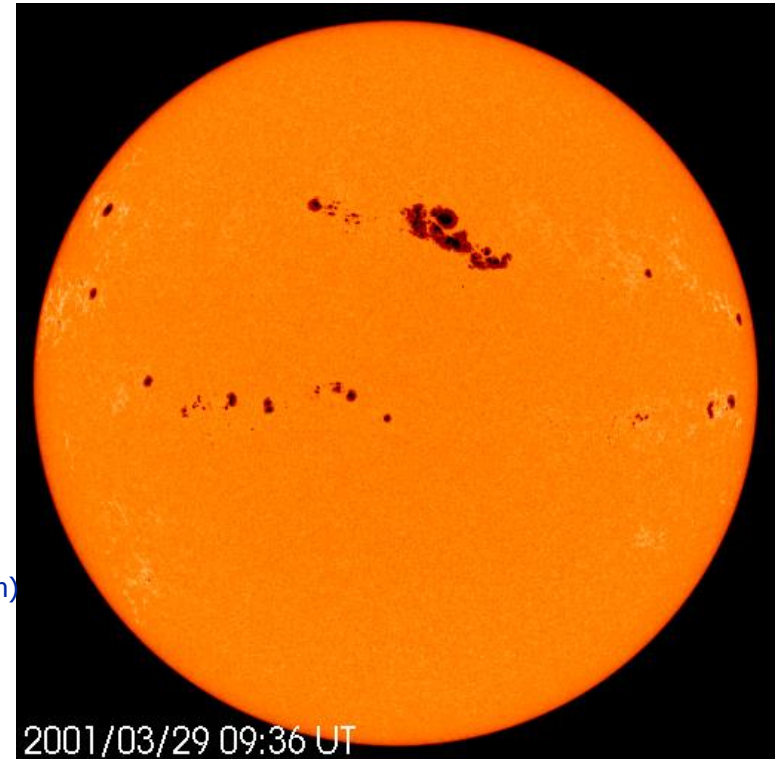
- ❑ This large group of sunspots produced a very huge solar storm.
- ❑ This produced beautiful Aurora



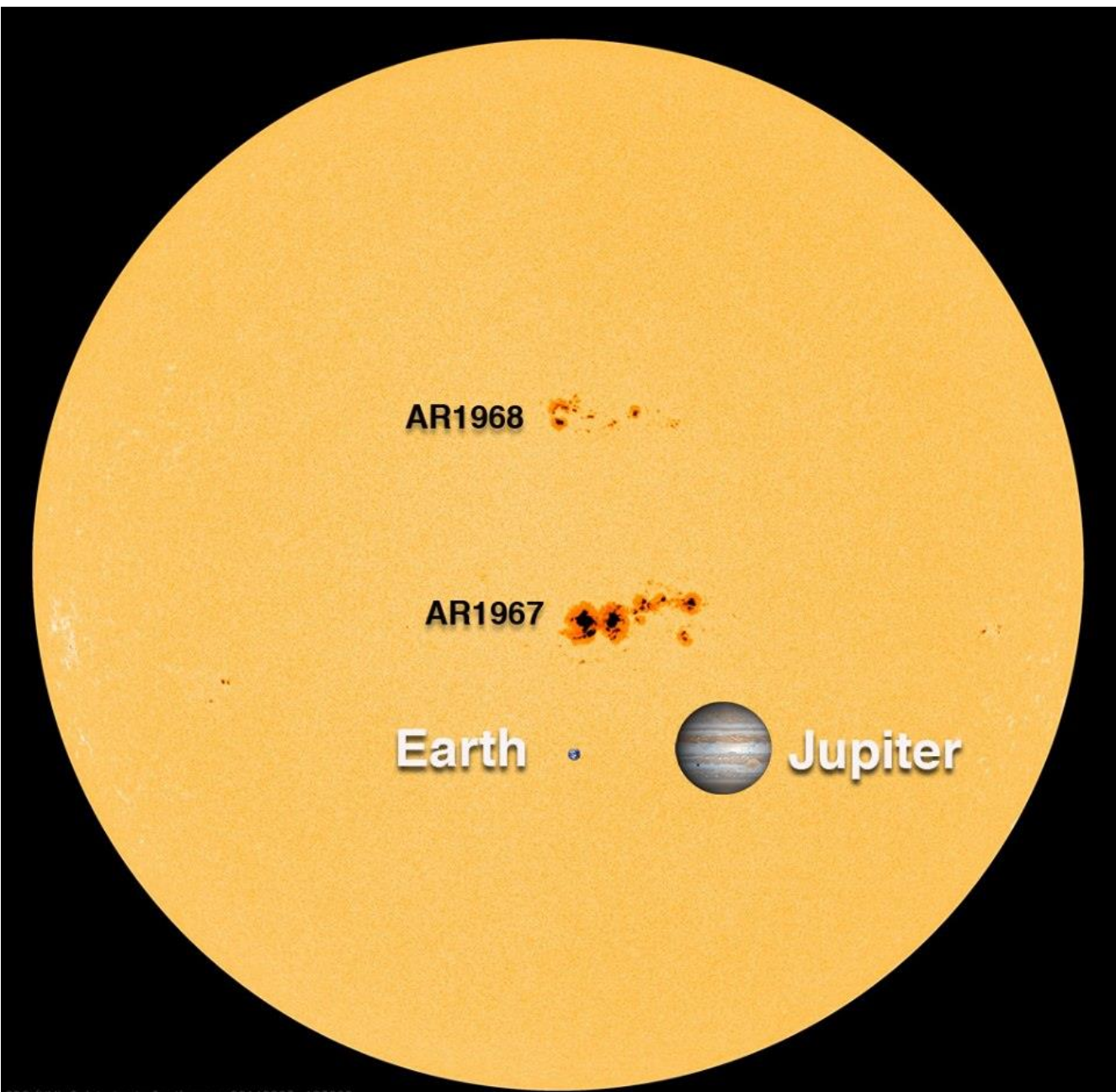
ALASKA (Zimmerman)



Nice (Benvenuto)

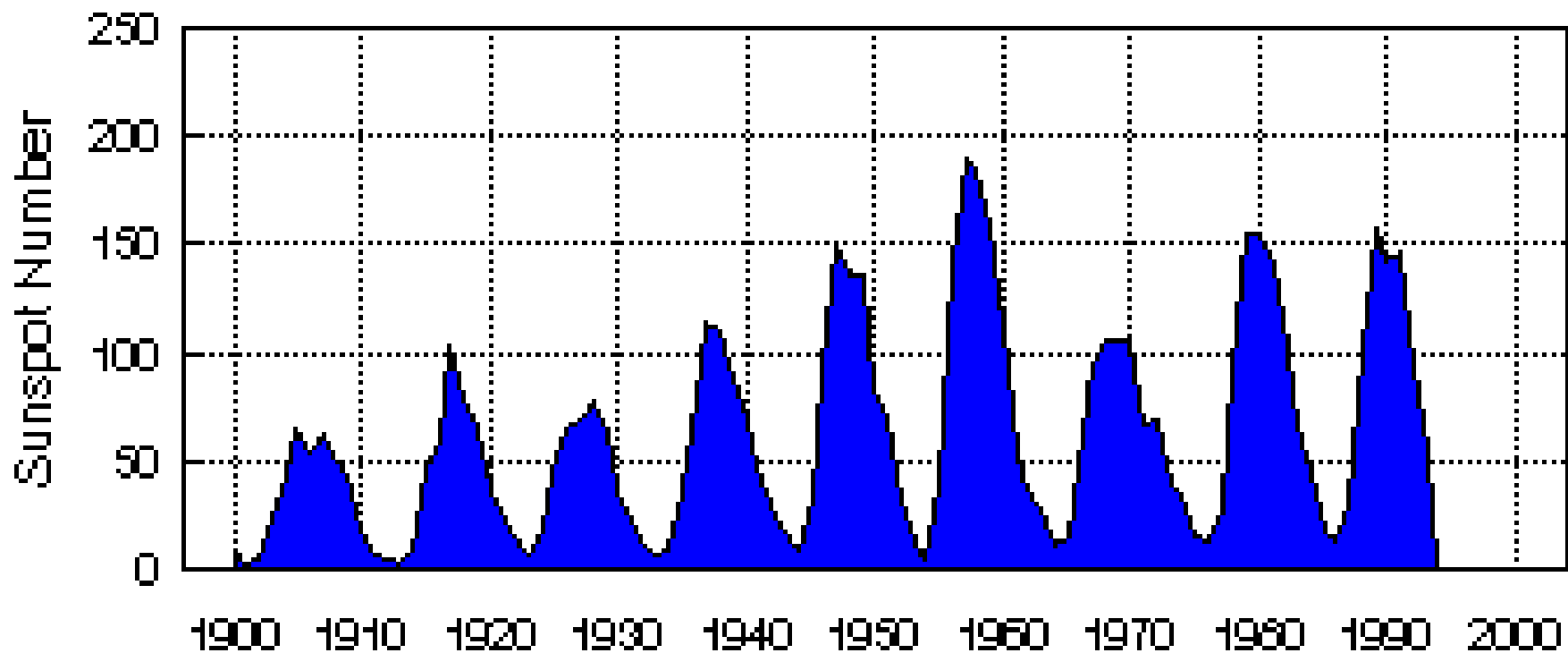


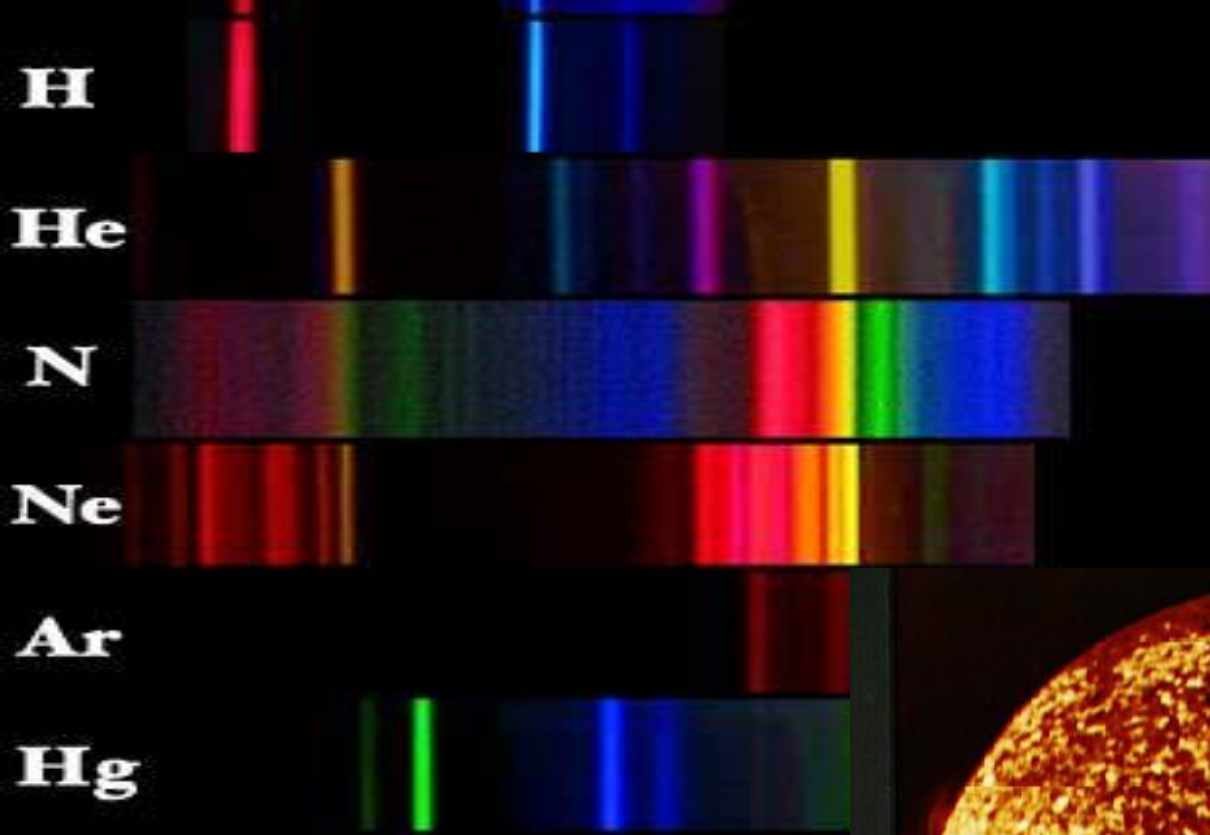
Sunspot activity - February 3rd 2014



Solar Activity Cycle - Sunspots

Annual Sunspot Numbers: 1900-2000

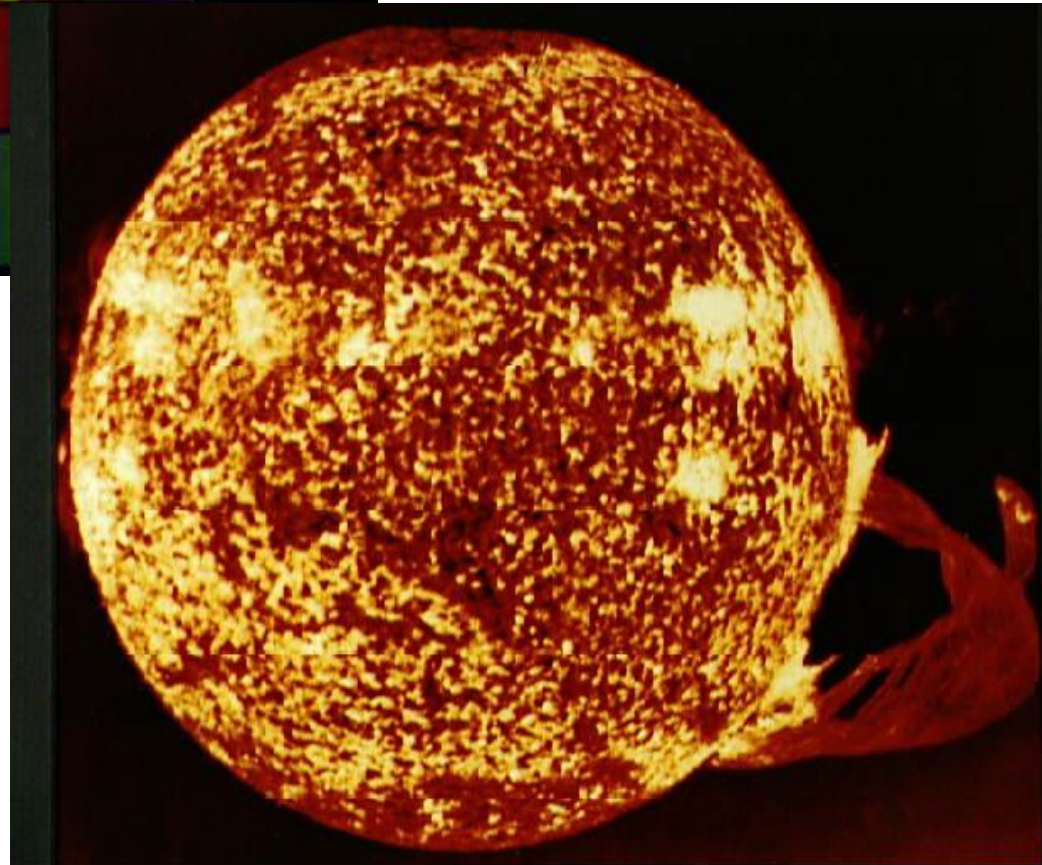




Helium ...

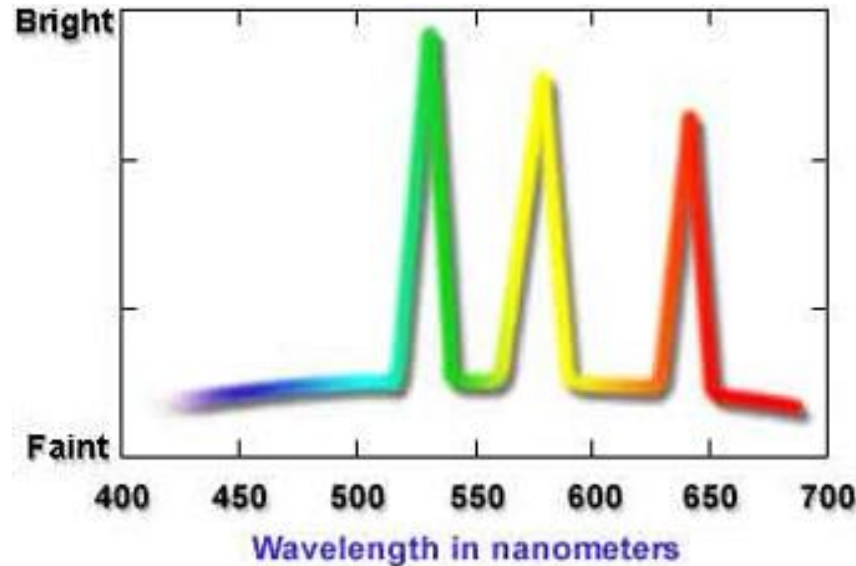
*..was first
discovered on
the Sun*

**Spectra from
different
elements....**



Coronium..a new element??

..a mysterious spectral line was seen during a total solar eclipse - green line (530.3nm). This was explained as a new element, coronium!!



Sun's surface is about 6,000C

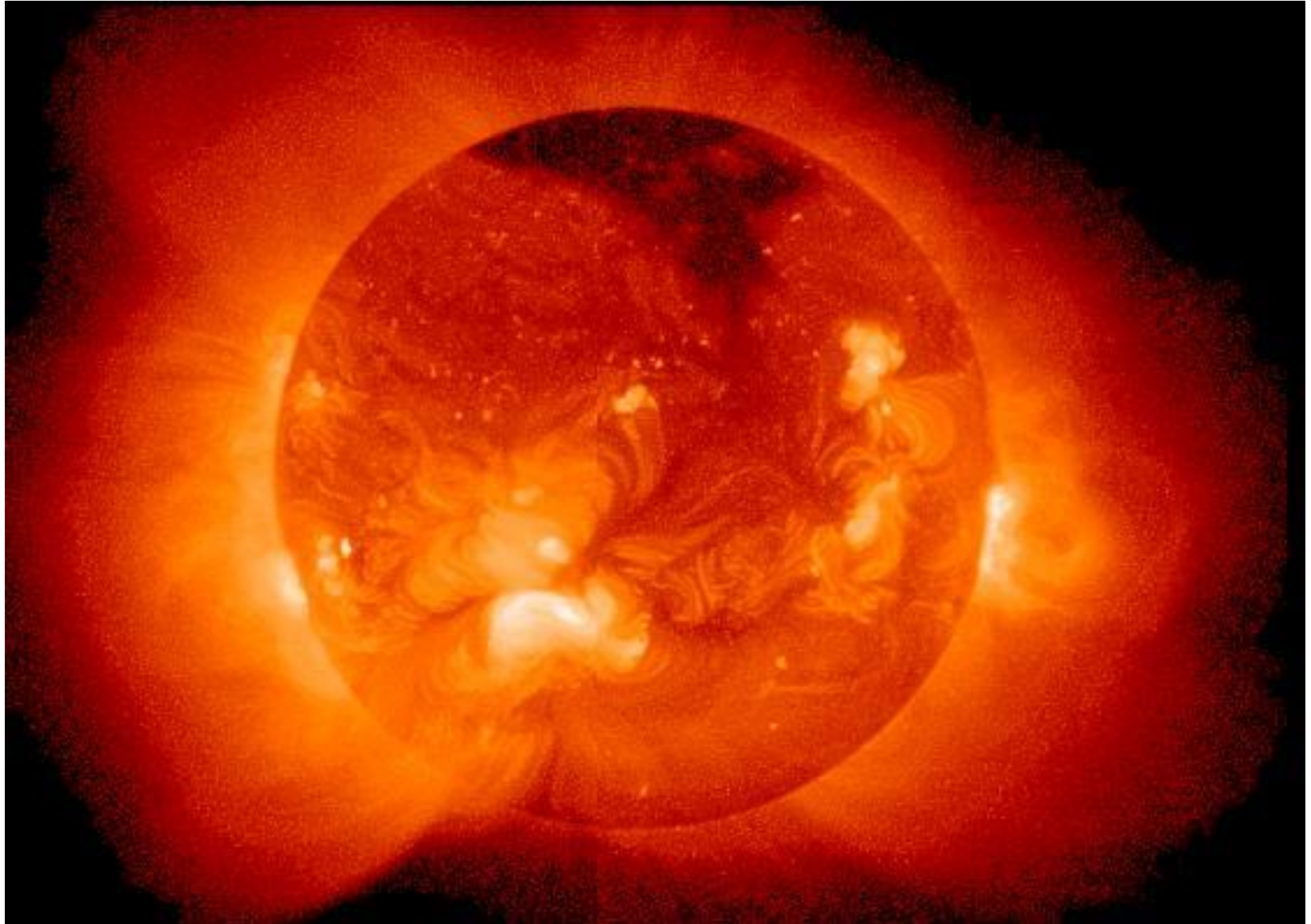
Solar atmosphere (corona) is a whopping 1,000,000C !!!

As the temperature rises, electrons get 'stripped off'.

By 1,000,000C, thirteen electrons have gone,

We call this Fe+13 or FeXIV

YOHKOH – the X-RAY Sun

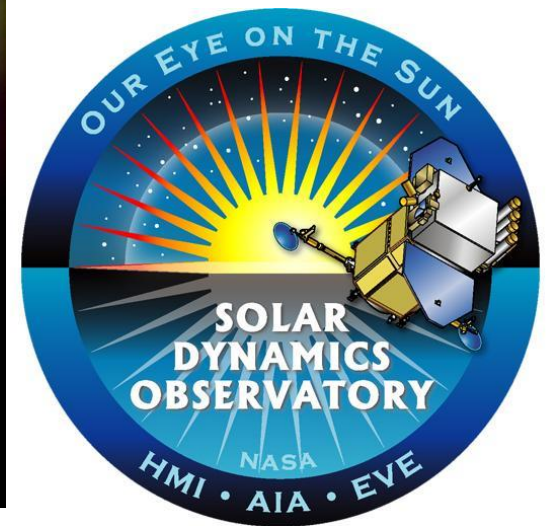
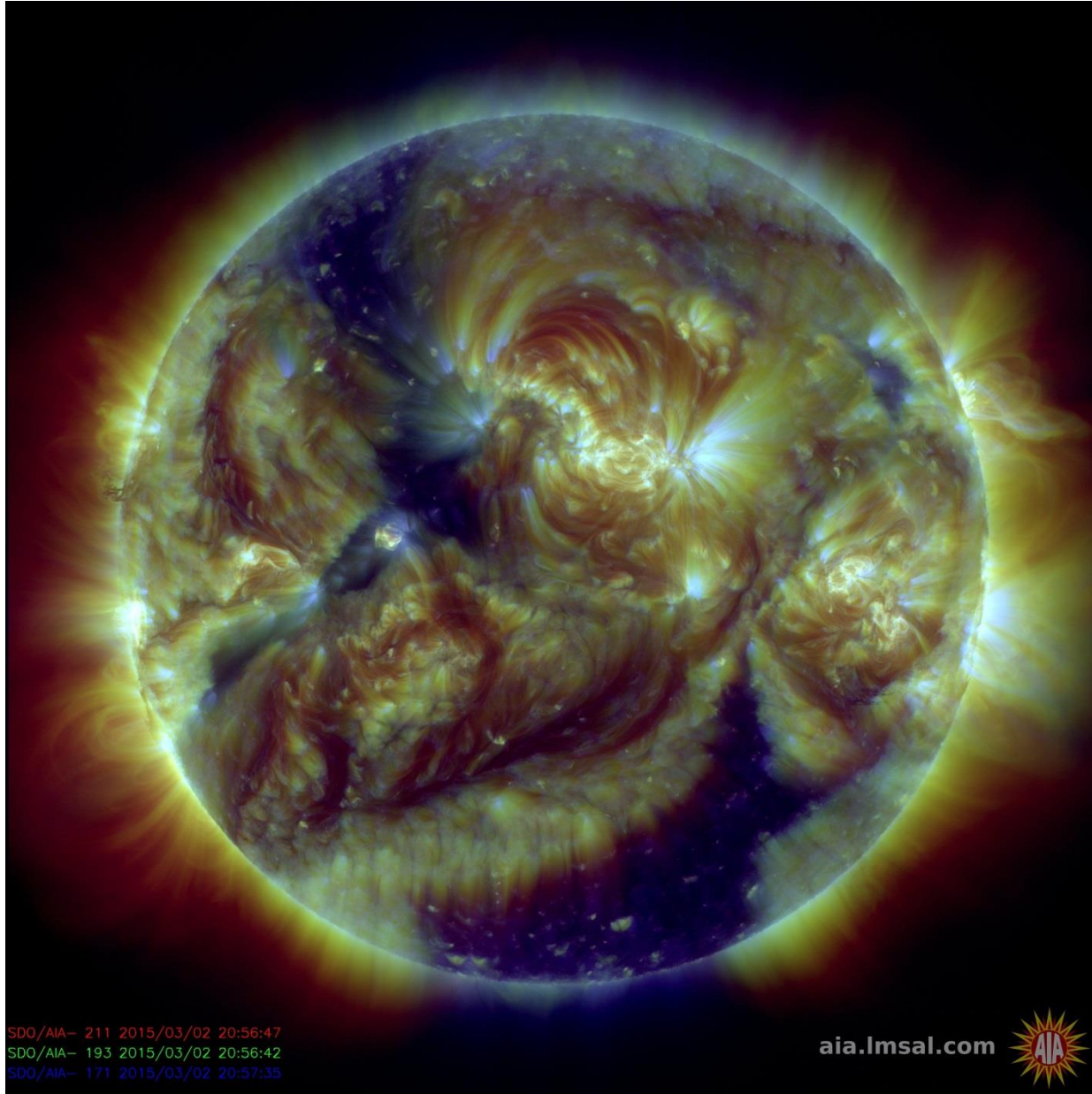


A collage of space-related images. The top left shows a blue nebula. The top center features the Sun and Earth. The top right shows the aurora borealis. The bottom left is a close-up of the Sun's surface. The bottom right shows the Sun with a white circle overlaid on it.

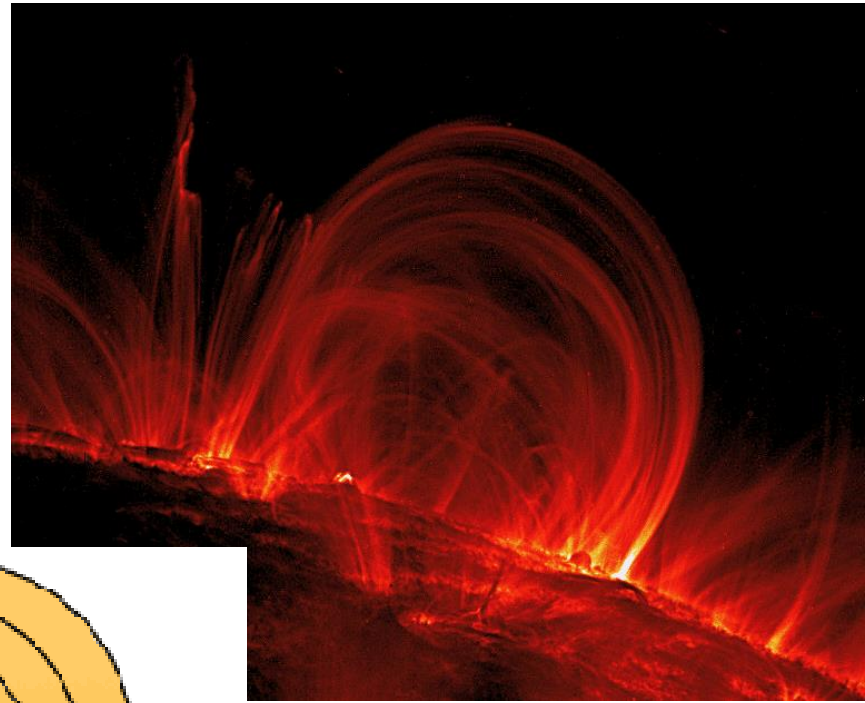
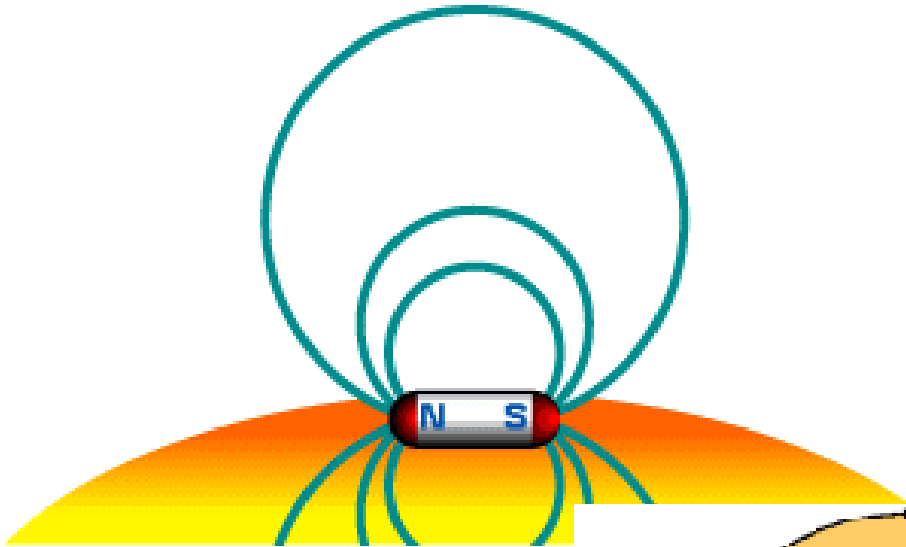
SOHO

New Views of the Sun

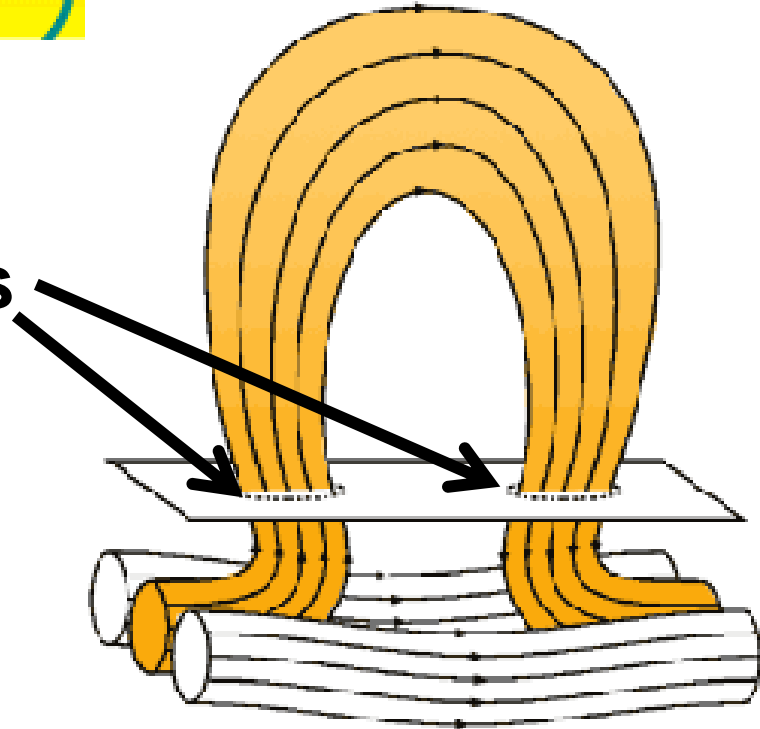
The Sun as seen by SDO, 2nd March 2015



The Sun's Magnetic Field and Active Regions

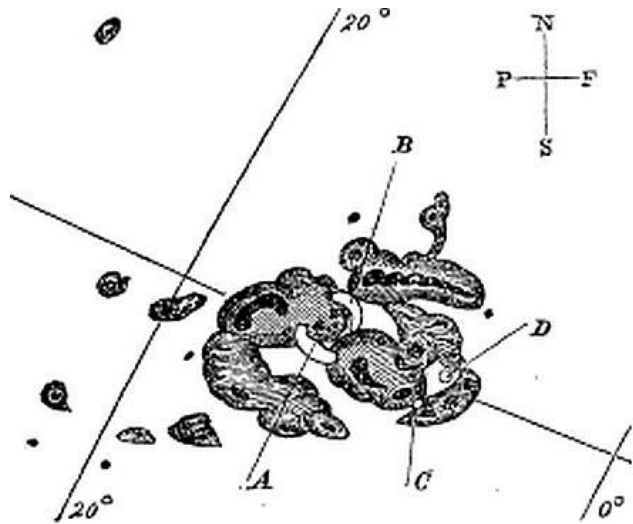


Sunspots

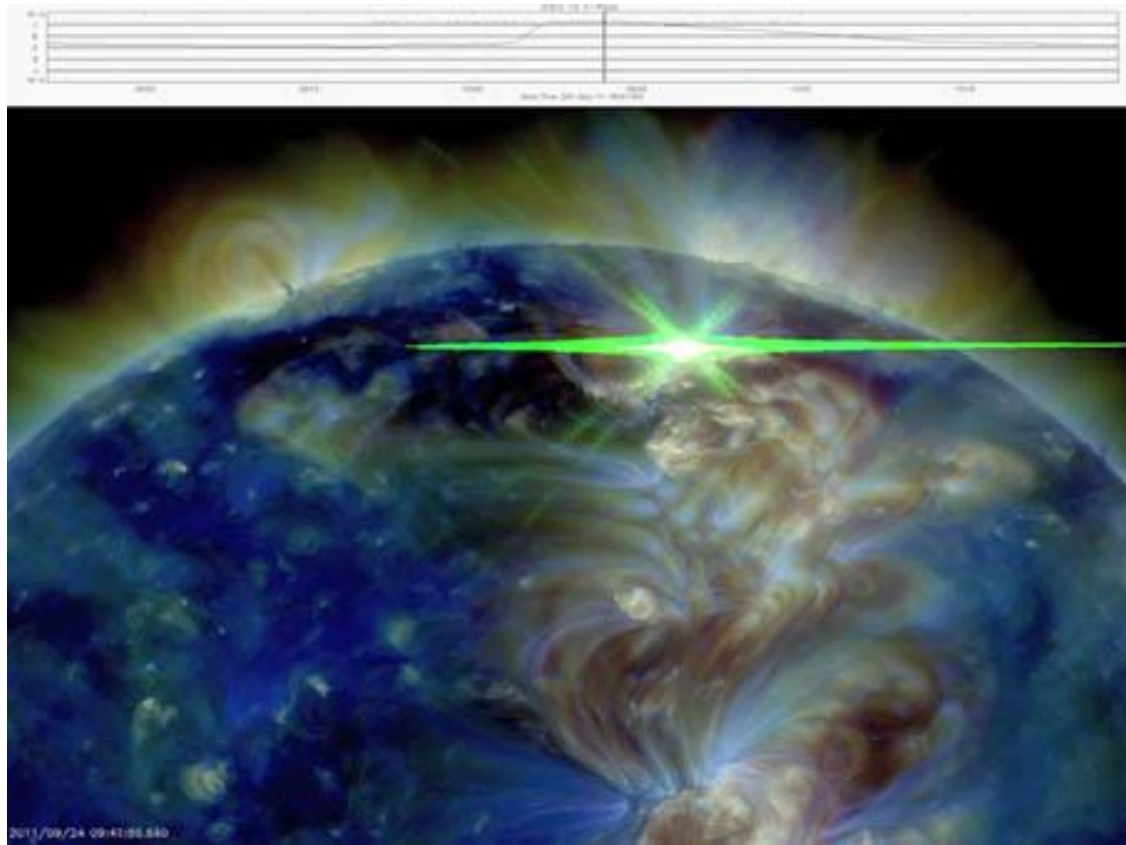


X-class flares

Carrington and Hodgson are credited with seeing the first solar flare on September 1st 1859. It was very bright in visible light, and must have been an X-class flare, resulting in an aurora.

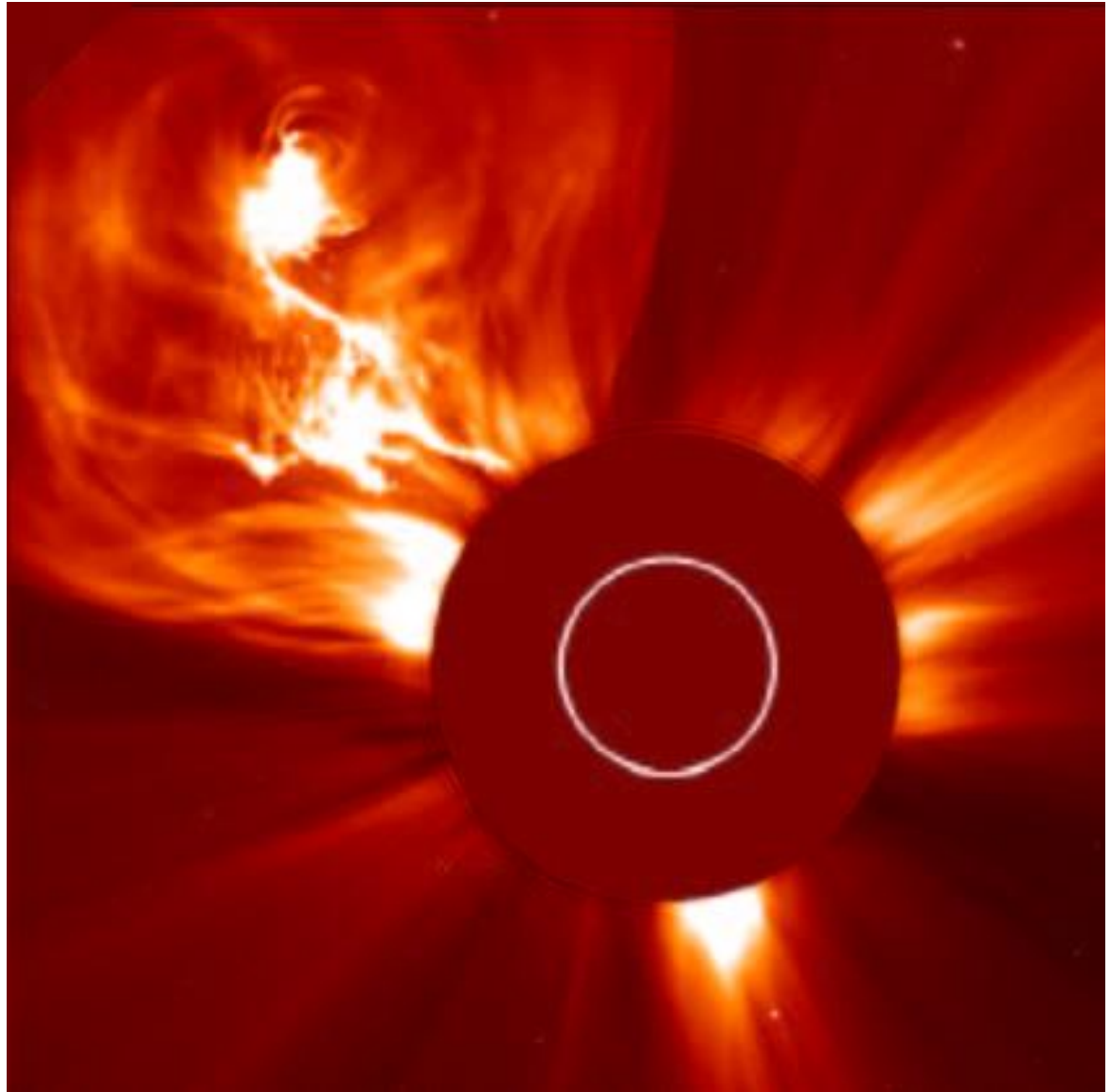


X-class flare seen by SDO

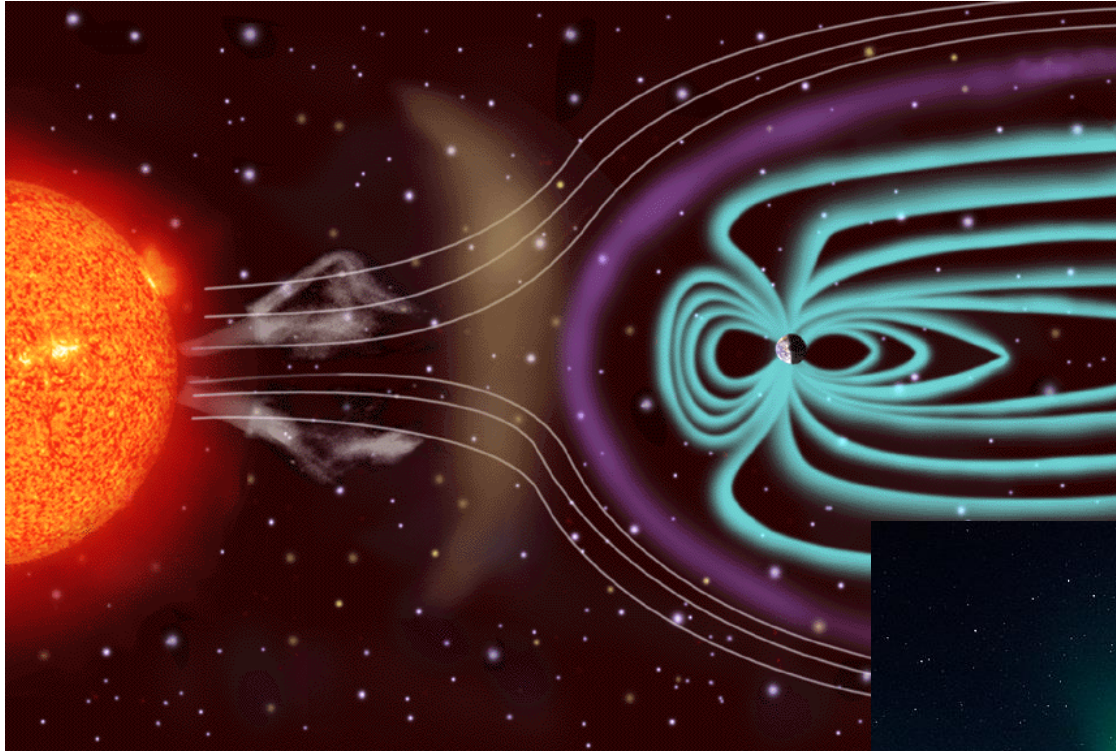


Coronal Mass Ejections (CME's)

1,000,000,000 tonnes
of material moving
with speeds of up to
2000 km/s



Solar storms that head towards Earth can...



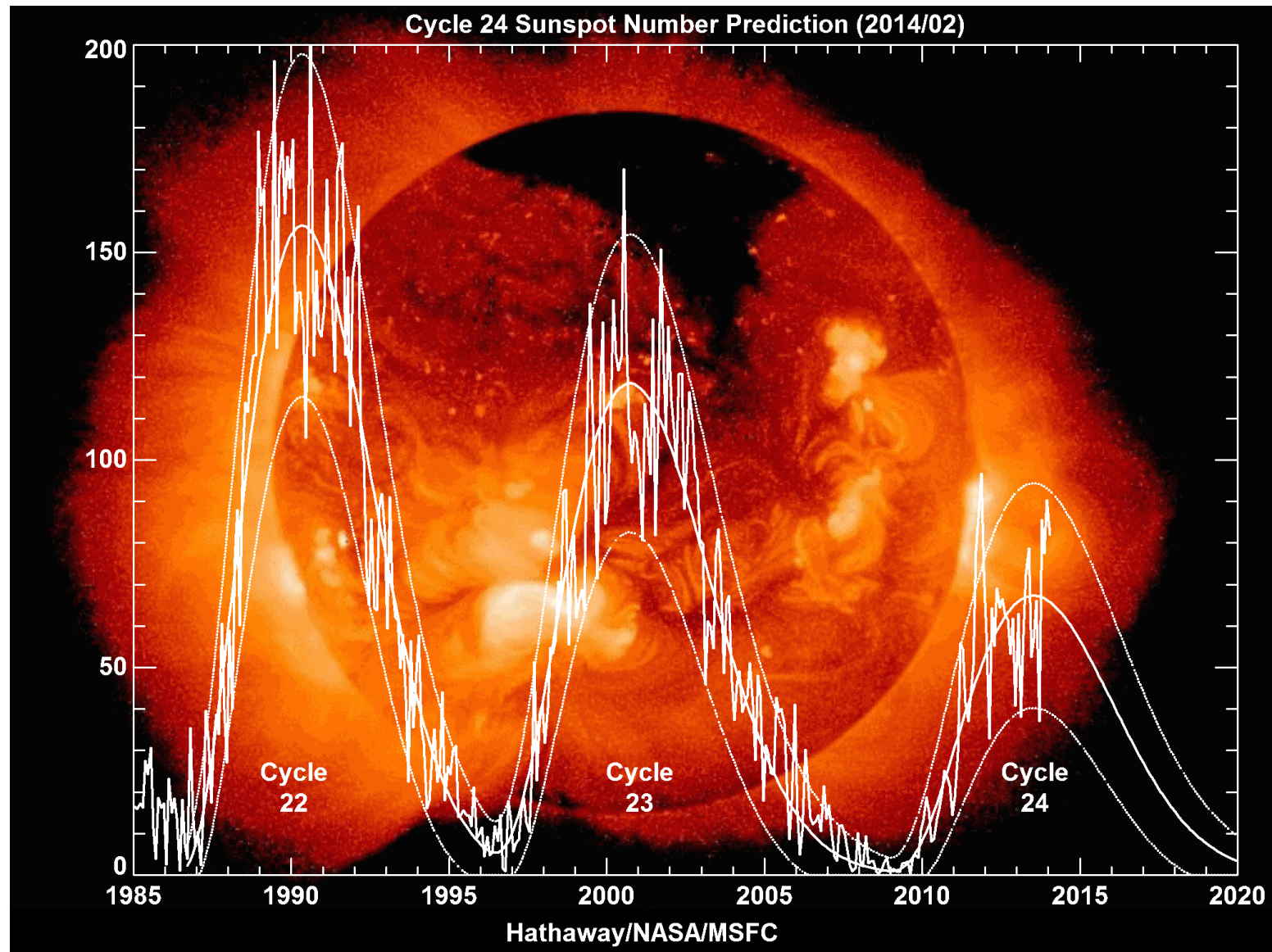
Cause an aurora

Damage satellites
Harm humans in space
Cause electricity blackouts
Affect polar flights



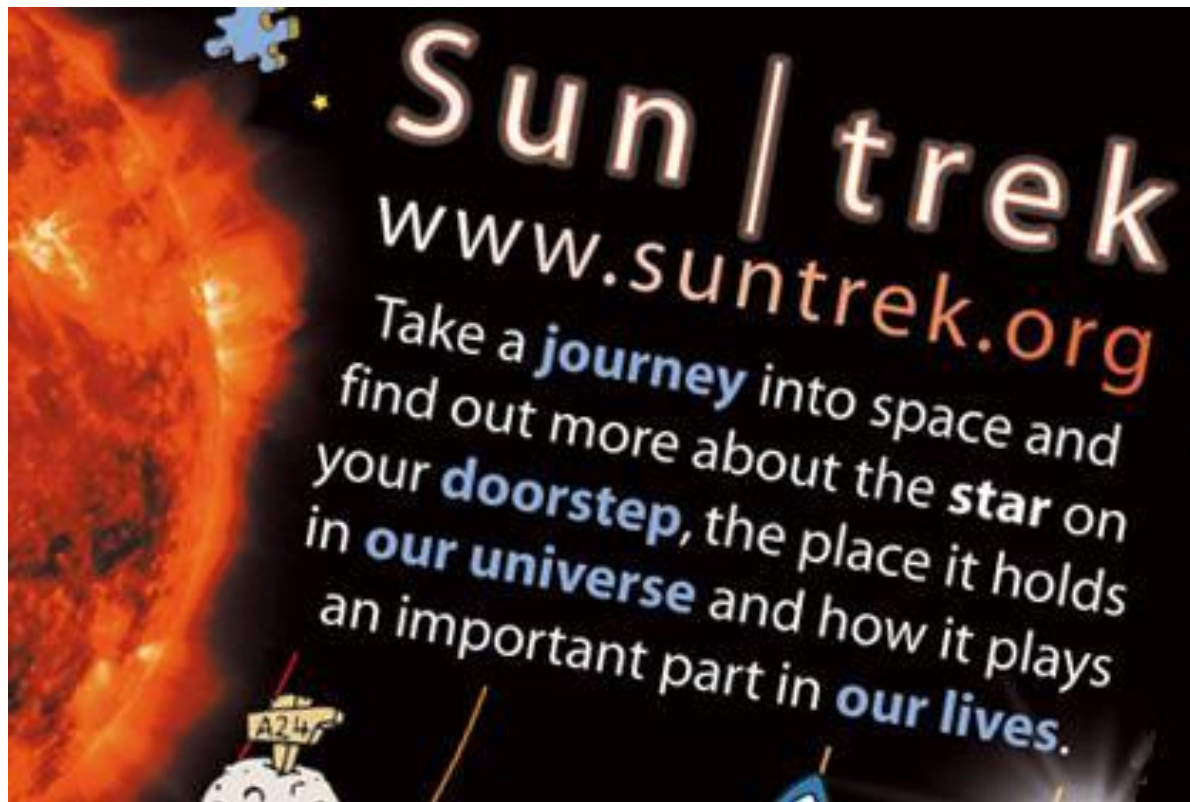
Photo credit: Bjorn Jorgensen

Recent sunspot activity



sun | trek

Sun | trek is an educational website created by UK solar researchers and teachers, led by Helen Mason.



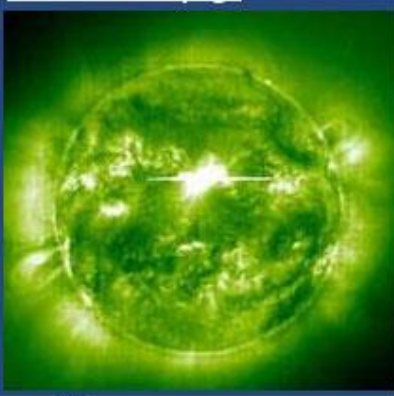
<http://www.suntrek.org/hot-solar-atmosphere/solar-eclipse/solar-eclipse.shtml>



Sun|trek adventures

Sun|trek homepage

Sun|trek homepage



- Homepage
- A quick tour
- Sun|trek adventures
- Solar guides
- Factory
- Gallery
- School Projects
- Classroom Resources
- Hot news
- Contact us
- The Sun|trek Team
- Useful links & resources


Welcome to Sun|trek. Take a journey into space and find out more about the Sun and its effect on the Earth..

Hinode

Using Hinode, we hope to better understand the connection between the Sun's magnetic field and its corona.

Some of the most startling movies and amazing results are being obtained.



What's New	What's Hot	School Stuff
<p>Check out our latest section on Solar Eclipses</p> 	<p>STEREO HINODE IHY</p> 	<p>Classroom Resources</p> <p>Schools Projects</p> 



There's lots of cool stuff on Sun|trek, dive in and start exploring here

We can't do your home work for you, but if you have a question about the Sun you can always ask the Sun|trek team



Check us out on



follow us on



Sun|trek

working with

Heather MacRae

(Space Media, UKSA)

Richard Healey

(Venture Thinking)

Geraldine Cox

(Artist in Residence, IC)



UK SPACE
AGENCY



UNIVERSITY OF
CAMBRIDGE

Sun|trek



Venture
Thinking



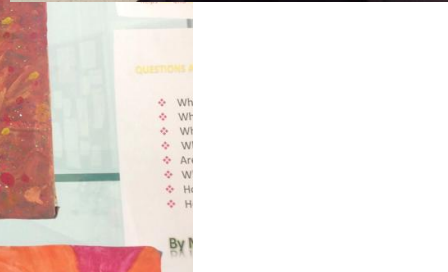
Sun/Art projects

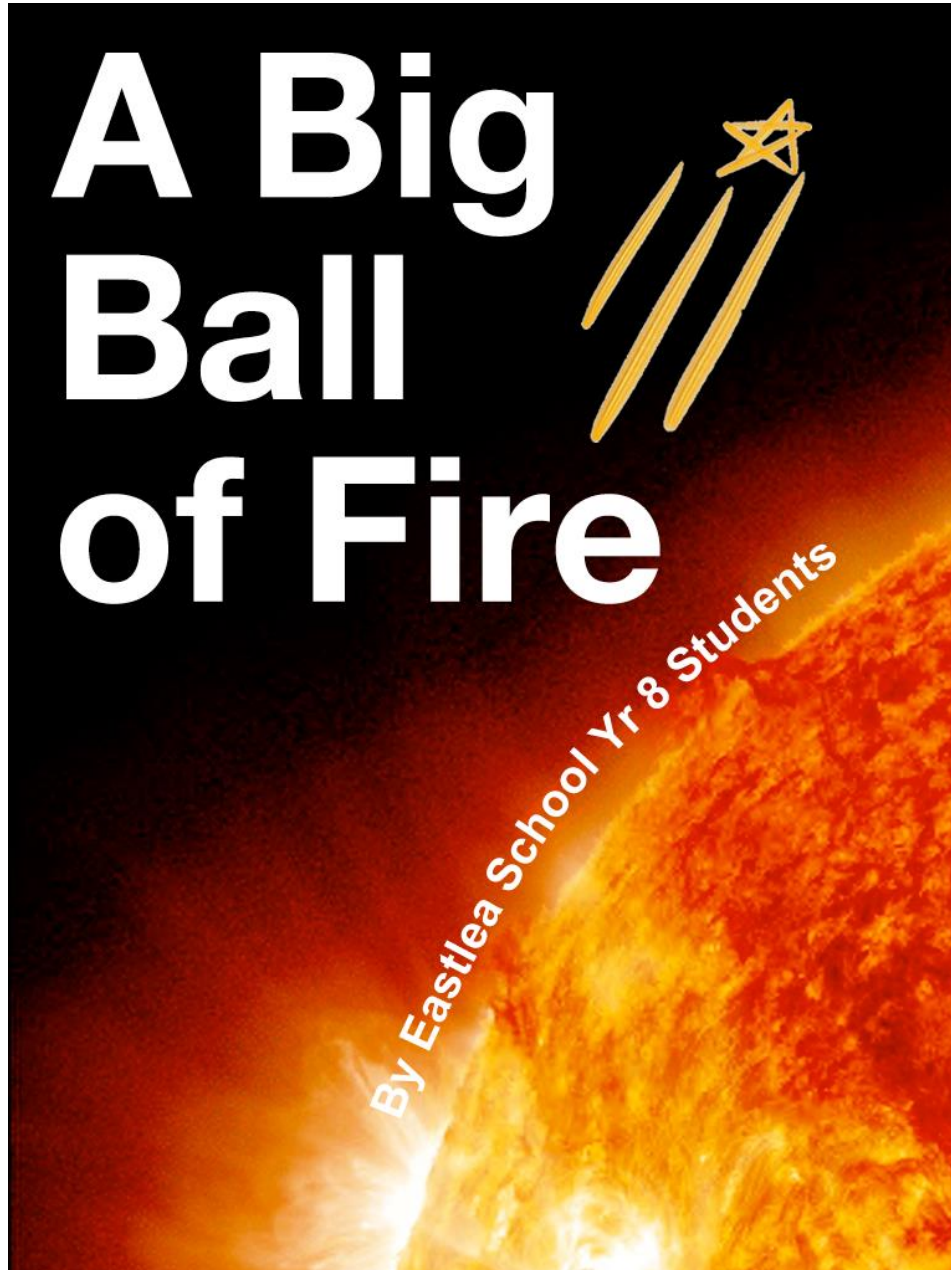
**St Ambrose Barlow
High School, Salford
May/June 2014**



http://issuu.com/ideasfoundation/docs/st_ambrose_hot_spot_exhibition_cata

'I am proud' student





Eastlea School, Yr 8

Science communication fostered by creativity and collaboration

Students led the contents, choosing art, cupcakes, craft activities, video interviews, quiz formats...



Cupcakes, Coronas and Creativity

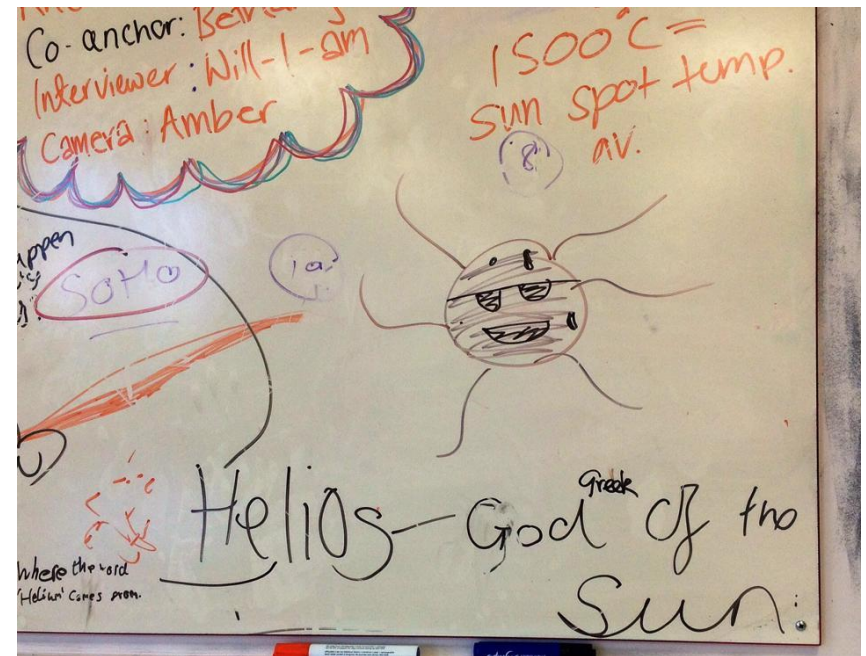
Exploring colours and UV radiation, UV Beads, Sun catchers, sunspots and cupcakes





Credit: John Currin

Ely College, Sun - Space Media Day, Yr 9



with Miriam Chaplin

- UK schools (KS 3&4)
- Linked to the NC
- Included on ESERO website
- Solar Images and Data
- Space Weather Effects
- Spectra

Also KS3 projects by

Mike Cripps

Maths projects by

Graham Colman

Projects
for Schools
Using REAL
Solar Data

Thank You!

