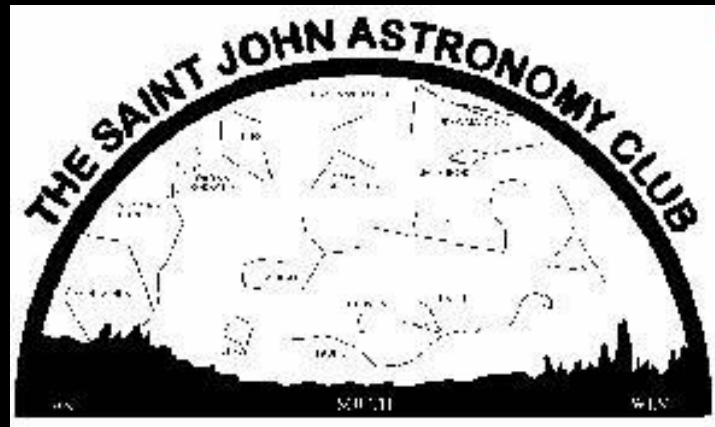


Welcome

To the SJAC Meeting



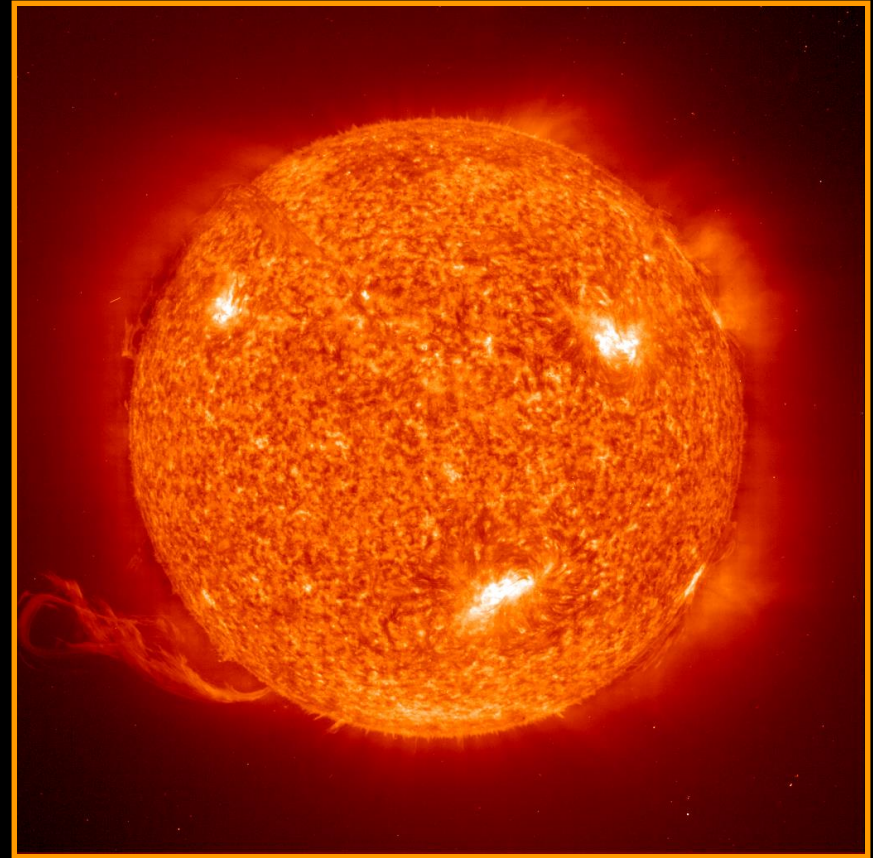
The Sun



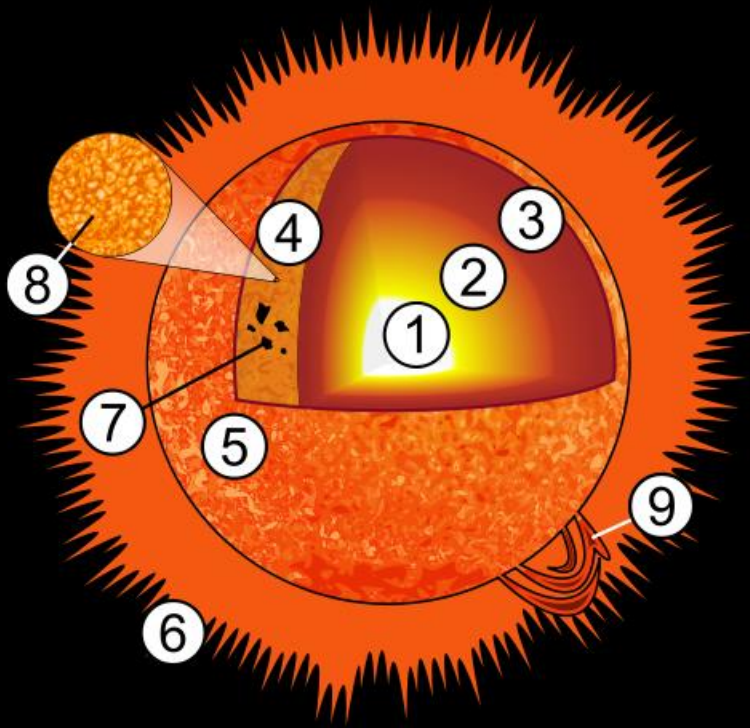
By Mike Powell

What is the Sun

- The Sun is the most prominent feature in our solar system. It is the largest object and contains approximately 98% of the total solar system mass.
- One hundred and nine Earths would be required to fit across the Sun's disk, and its interior could hold over 1.3 million Earths.
- The Sun's outer visible layer is called the photosphere and has a temperature of $6,000^{\circ}\text{C}$ ($11,000^{\circ}\text{F}$). This layer has a mottled appearance due to the turbulent eruptions of energy at the surface.

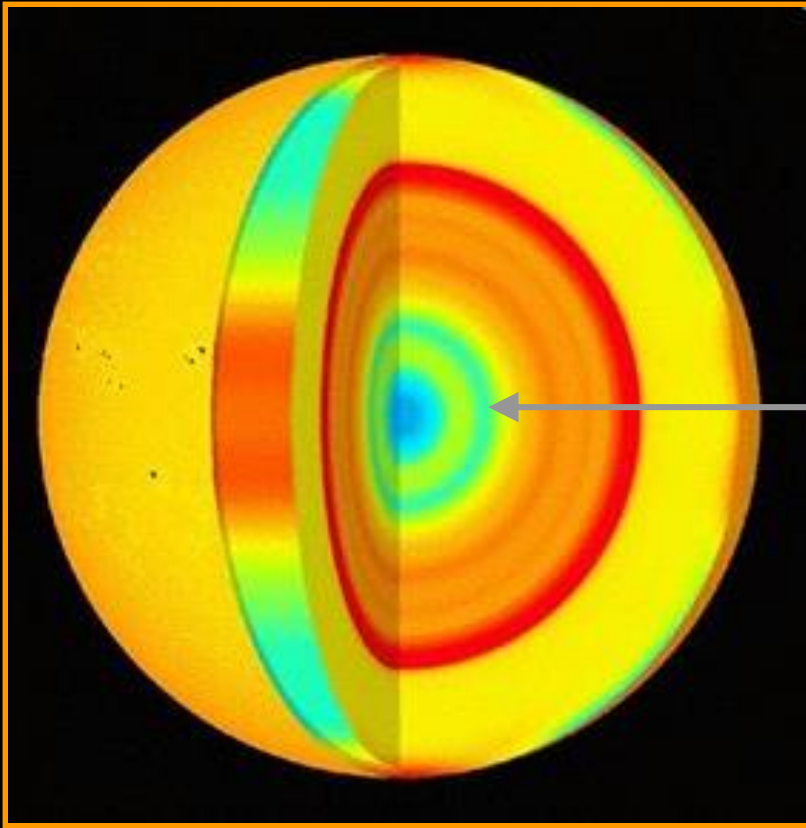


Sun's Makeup



- 1. Core
- 2. Radiative zone
- 3. Convective zone
- 4. Photosphere
- 5. Chromosphere
- 6. Corona
- 7. Sunspot
- 8. Granules
- 9. Prominence

The Core



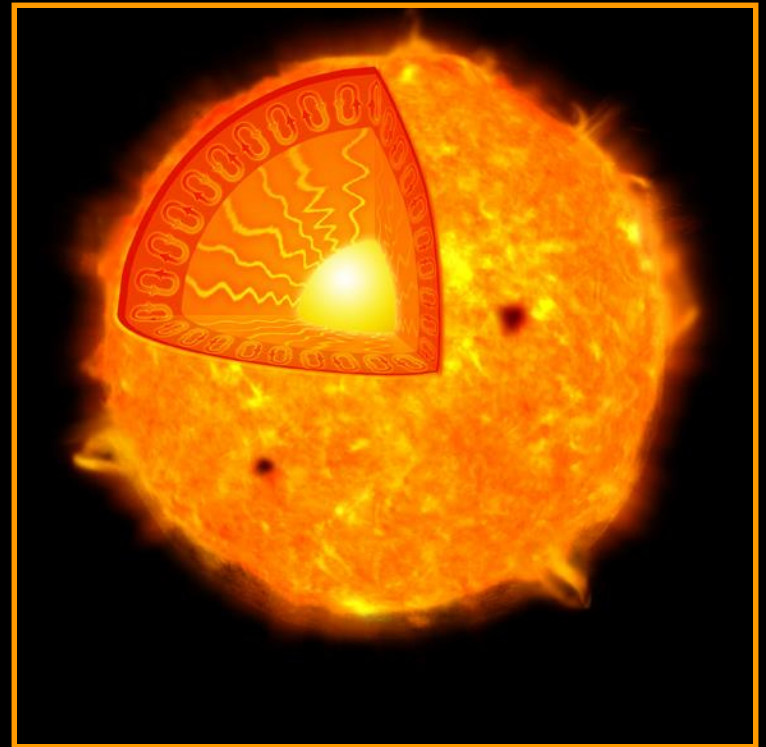
- Solar energy is created deep within the core of the Sun.
- It is here that the temperature ($15,000,000^{\circ}\text{C}$; $27,000,000^{\circ}\text{F}$) and pressure (340 billion times Earth's air pressure at sea level) is so intense that nuclear reactions take place.
- This reaction causes four protons or hydrogen nuclei to fuse together to form one alpha particle or helium nucleus

Radiative zone

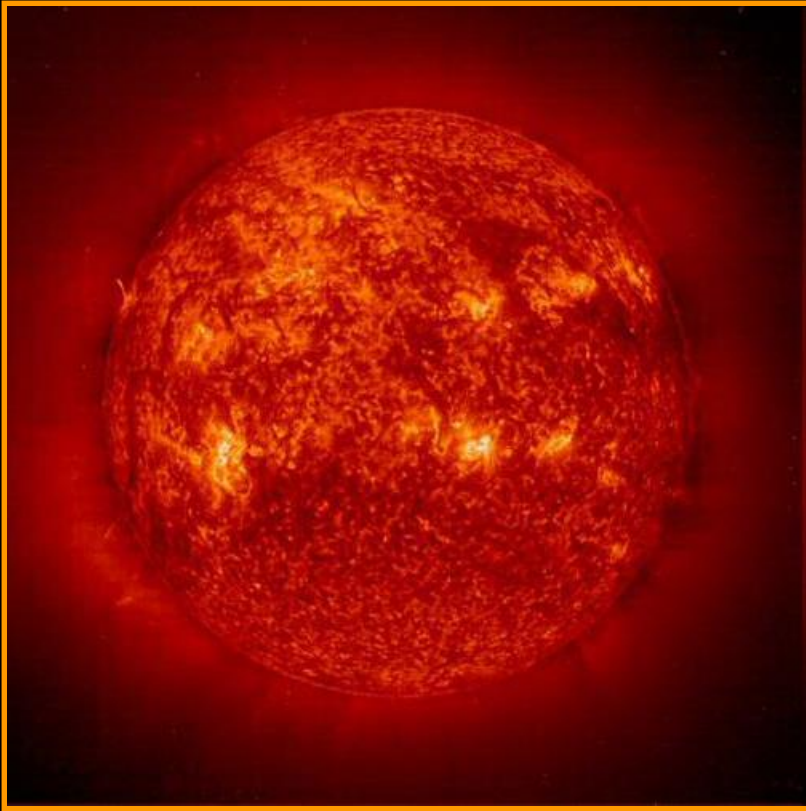
Convective zone

Photosphere

- The Sun has several layers: the core, the radiation zone, the convection zone, and the photosphere (which is the surface of the Sun).
- In the nuclear reactions that occur at the core about 700 million tons of hydrogen is converted to helium every second, and since helium is about 7% lighter, this means that some 5 million tons of matter/sec is converted into pure energy.
- This energy takes about 10 million years to travel from the core to the Sun's photosphere, a 500km thick layer from which most of the Sun's radiation and light finally escape



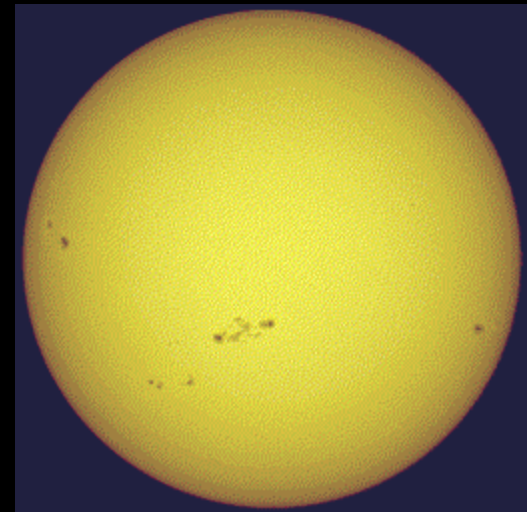
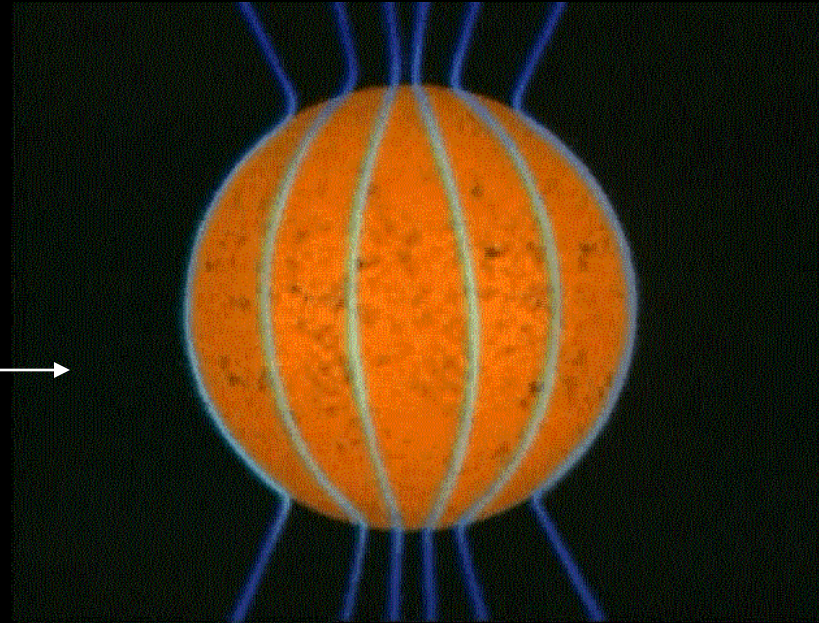
Chromosphere



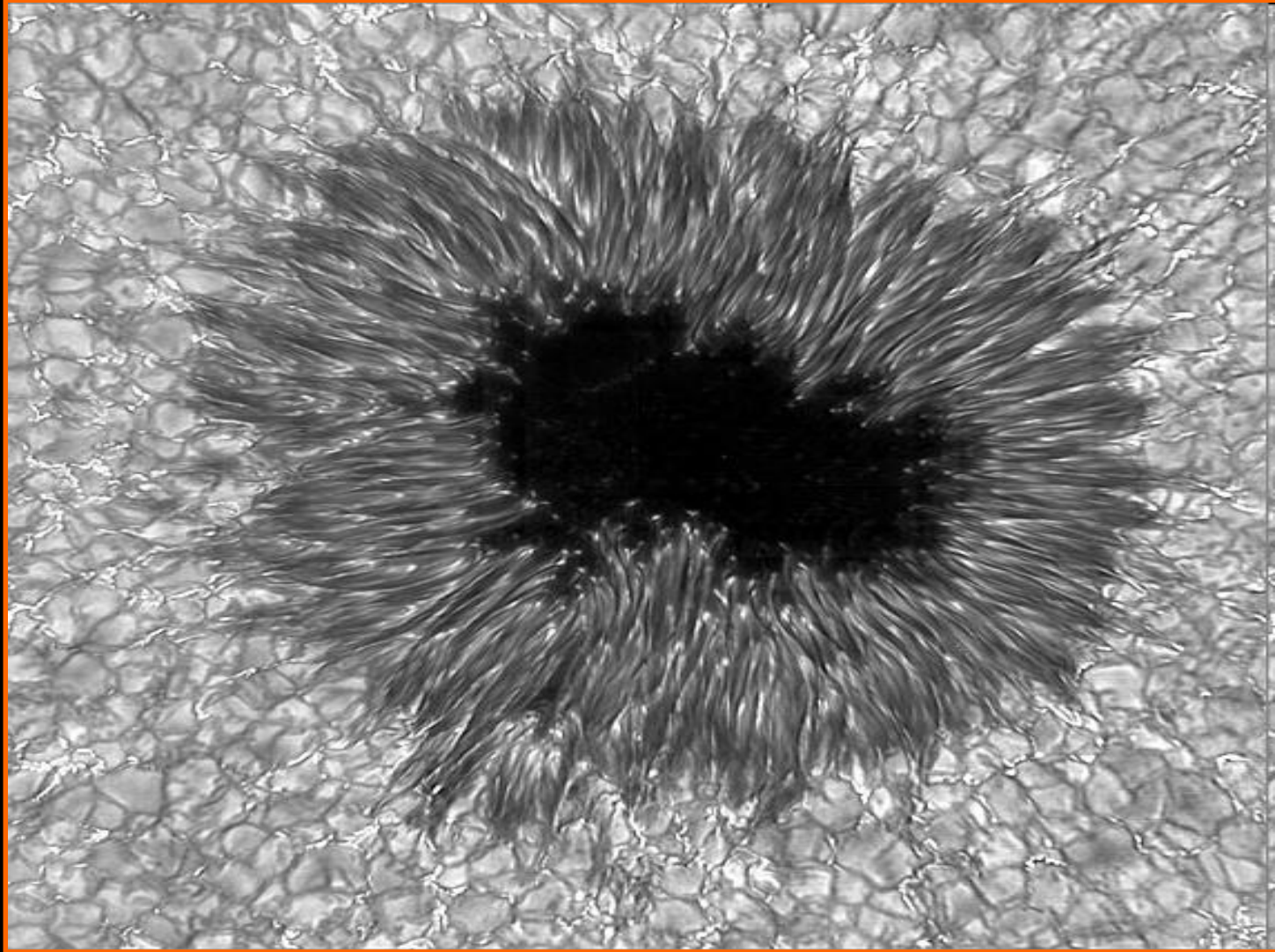
- The chromosphere is above the photosphere.
- Solar energy passes through this region on its way out from the center of the Sun.
- Faculae and flares arise in the chromosphere. Faculae are bright luminous hydrogen clouds which form above regions where sunspots are about to form.
- Flares are bright filaments of hot gas emerging from sunspot regions

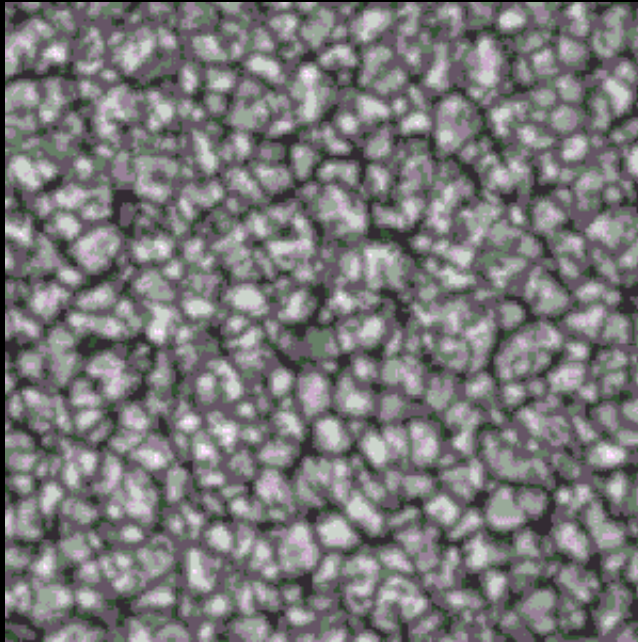
Sun Spots

- At sunspot minimum, the magnetic field is relatively straight like lines of latitude. Because the equator rotates faster than the poles (differential rotation), as time goes on the field gets twisted.
- During the course of 11 years, the magnetic field becomes so twisted and tangled that some of the field breaks through the Sun's surface causing sunspots.
- We see them because they are cooler than the rest of the Sun
- The process of tangling is stopped when the system suddenly relaxes to the straight lines and the sun's overall magnetic field reverses for the next 11 years



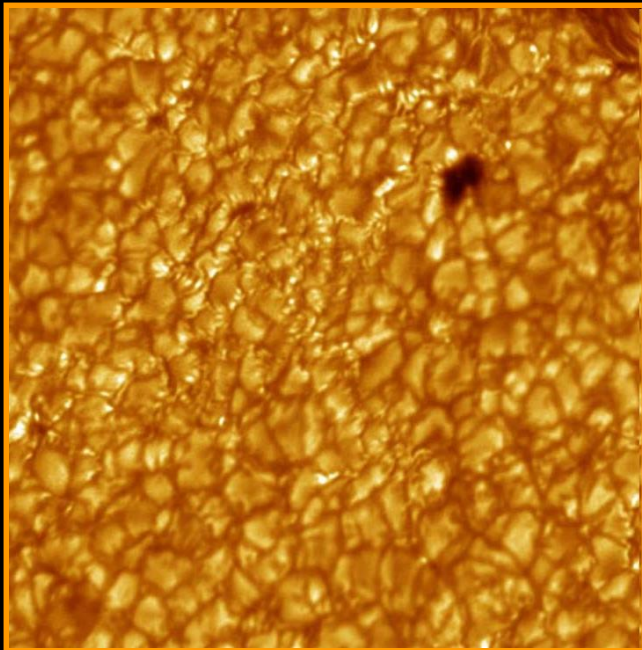
Sun Spot





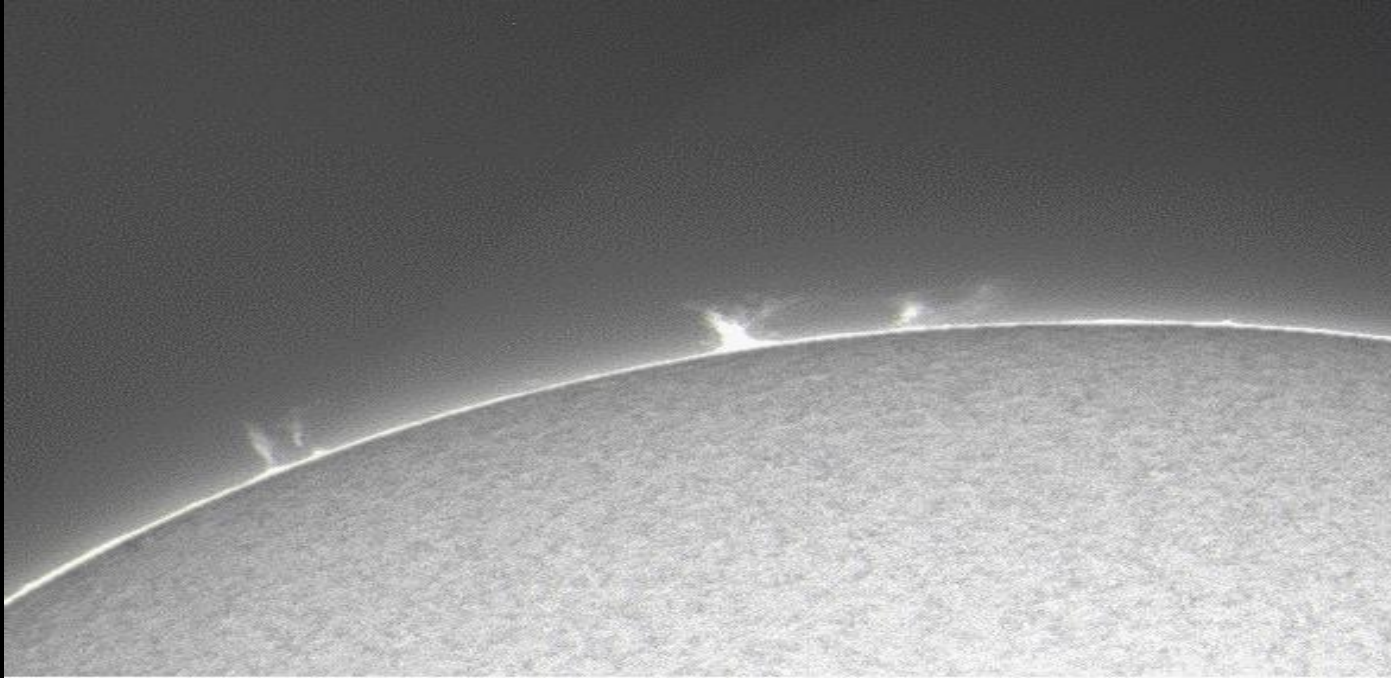
Granules

- Granules are regions of the sun where hot solar material comes to the solar surface.
- Granules are about 600 miles (1,000 km) across and only exist for about 5 to 10 minutes before they fade away.
- It is almost as though the surface of the Sun is bubbling like a pot of boiling water.

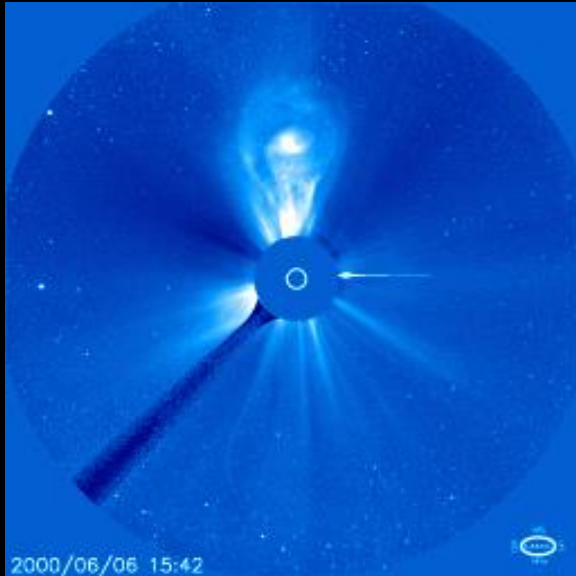


Solar Prominence

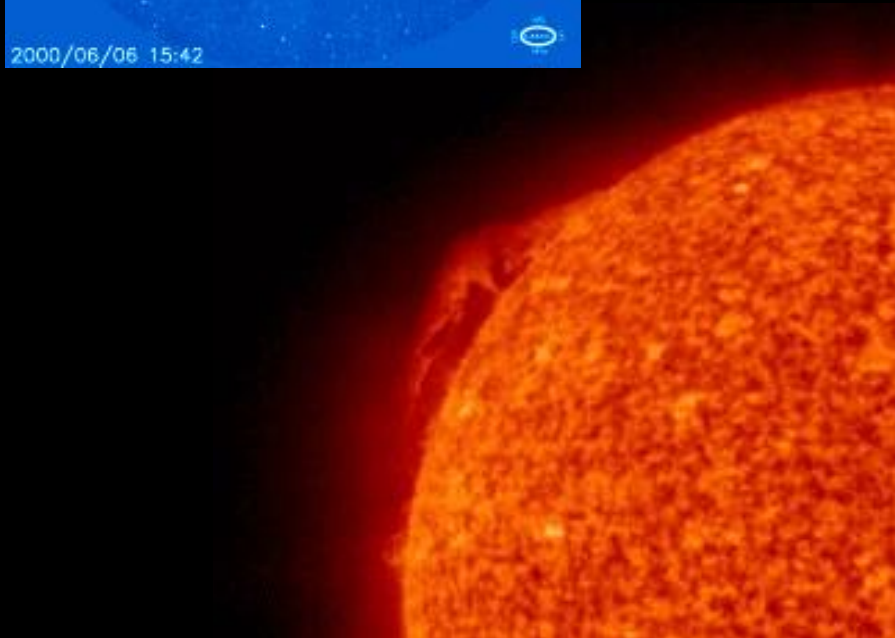
A solar prominence (also known as a filament) is an arc of gas that erupts from the surface of the Sun. Prominences can loop hundreds of thousands of miles into space. Prominences are held above the Sun's surface by strong magnetic fields and can last for many months. At some time in their existence, most prominences will erupt, spewing enormous amounts of solar material into space.



CORONAL MASS EJECTION



- Coronal mass ejections, or CMEs, are violent discharges of material from the Sun's outer atmosphere.
- The ejected material can travel at speeds of up to a million miles per hour.
- If this flow of charged particles and embedded magnetic field collides with Earth, it can dramatically disrupt Earth's geomagnetic field and ionosphere.

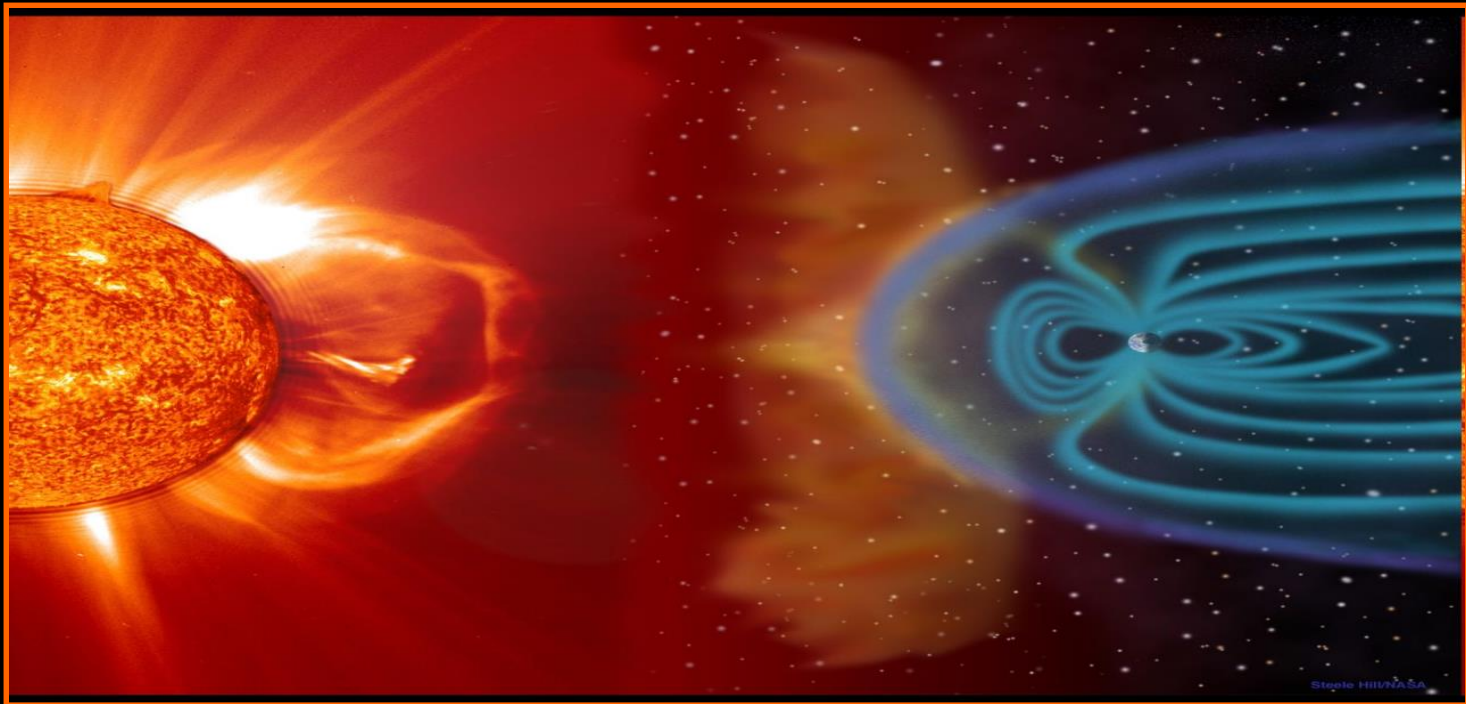


Aurora Borealis

When the Coronal mass ejection reaches the Earth it may disrupt the Earth's magnetosphere, compressing it on the day side and extending the night-side magnetic tail.

This process can cause particularly strong aurora in large regions around Earth's magnetic poles.

These are also known as the Northern Lights (aurora borealis) in the northern hemisphere, and the Southern Lights (aurora australis) in the southern hemisphere. Coronal mass ejections, along with solar flares of other origin, can disrupt radio transmissions, cause power outages, and cause damage to satellites and electrical transmission line facilities.

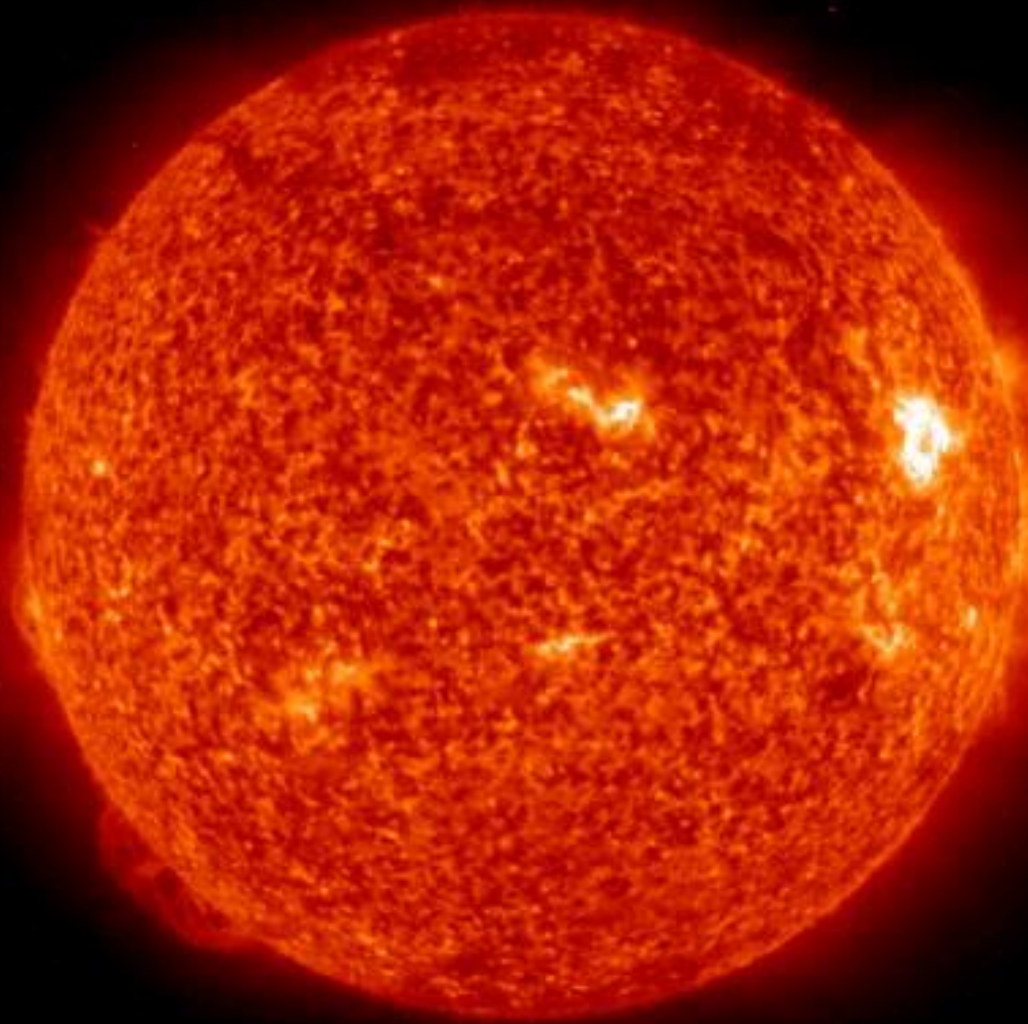


Northern Lights



The bright dancing lights of the aurora are actually collisions between electrically charged particles from the sun that enter the earth's atmosphere. The lights are seen above the magnetic poles of the northern and southern hemispheres. They are known as 'Aurora Borealis' in the north and 'Aurora australis' in the south..

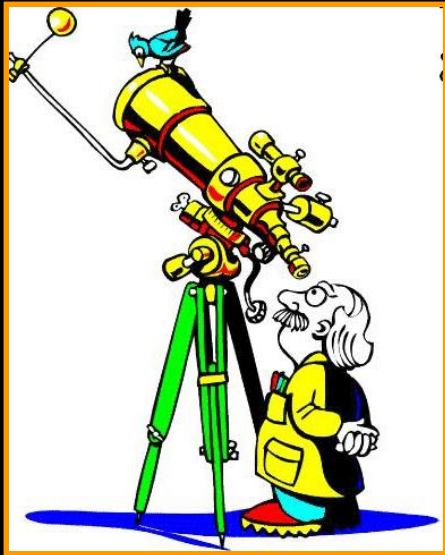
Auroral displays appear in many colours although pale green and pink are the most common. Shades of red, yellow, green, blue, and violet have been reported. The lights appear in many forms from patches or scattered clouds of light to streamers, arcs, rippling curtains or shooting rays that light up the sky with an eerie glow



Our Sun

The End

Thank You



! WARNING !



**The last person
that touched
my telescope is
in my backyard!**

