

The Sun

Week 11

- The sun's diameter is 1.4 million km
- That's around 100 times the Earth's diameter

- The distance to the sun is 150 million km (1 AU)
- The sun only appears half a degree in size

The sun is a spinning ball of gas...

- Roughly...
- 75% hydrogen
- 25% helium

- Some other gases are also present in very small proportions

Photosphere:

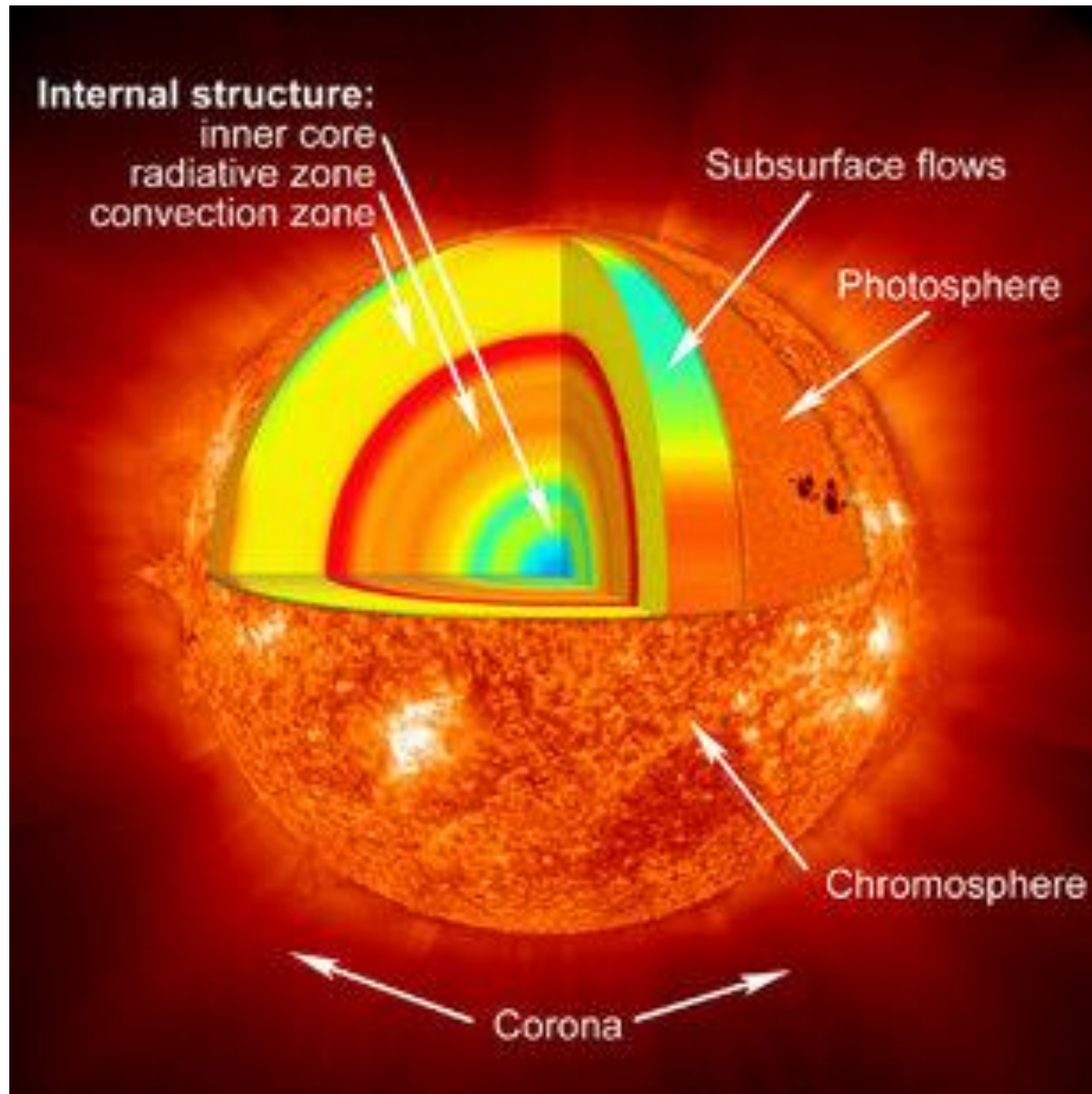
the visible surface
6000 deg C
400 km thick

Chromosphere:

28,000 deg C
2500 km thick

Corona:

1.2 million deg C
a few million km thick

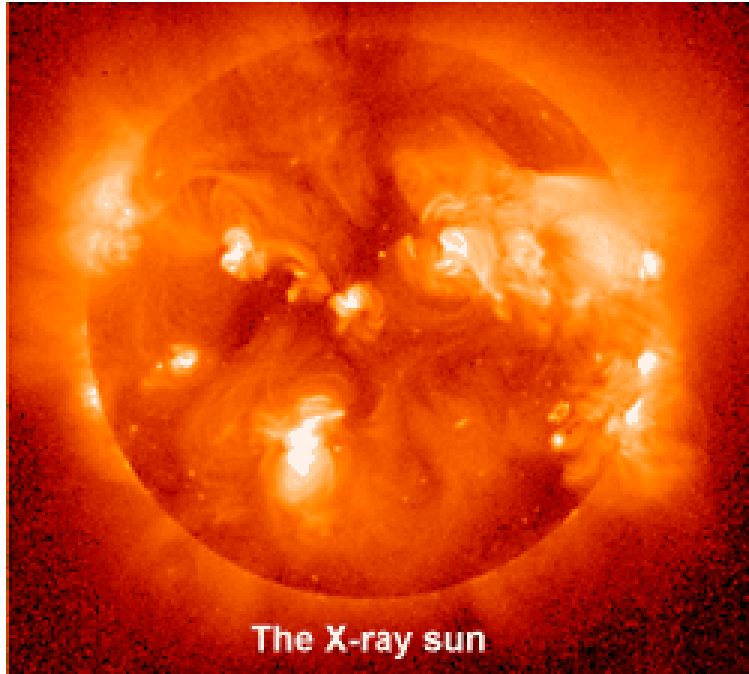


The chromosphere
and corona are
only visible to us in
a total solar eclipse



Safe observing of the sun

- NEVER look directly at the sun



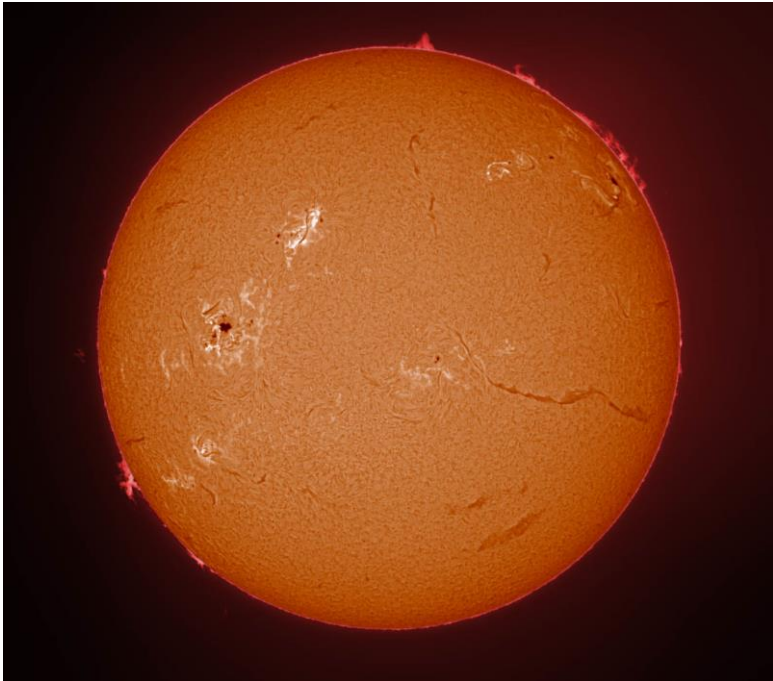
The X-ray sun

X-rays are produced by extremely hot regions of the sun.

The Chandra telescope obtained these images

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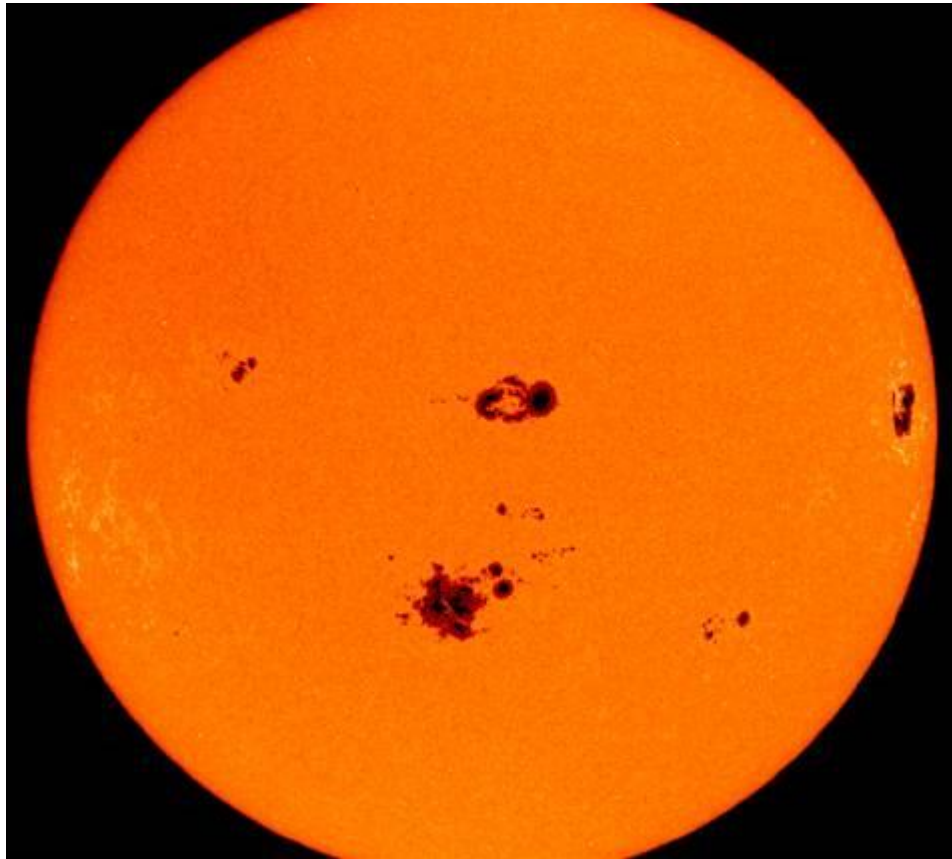


This is a H-alpha image of the sun

The H-alpha filter only lets a few wavelengths of visible light through. That light is produced by hot ionised hydrogen gas

The astronomer can see prominences and filaments, and sunspots

Sunspots



Sunspots are temporary features on the photosphere.

Dark regions, cooler than their surroundings.

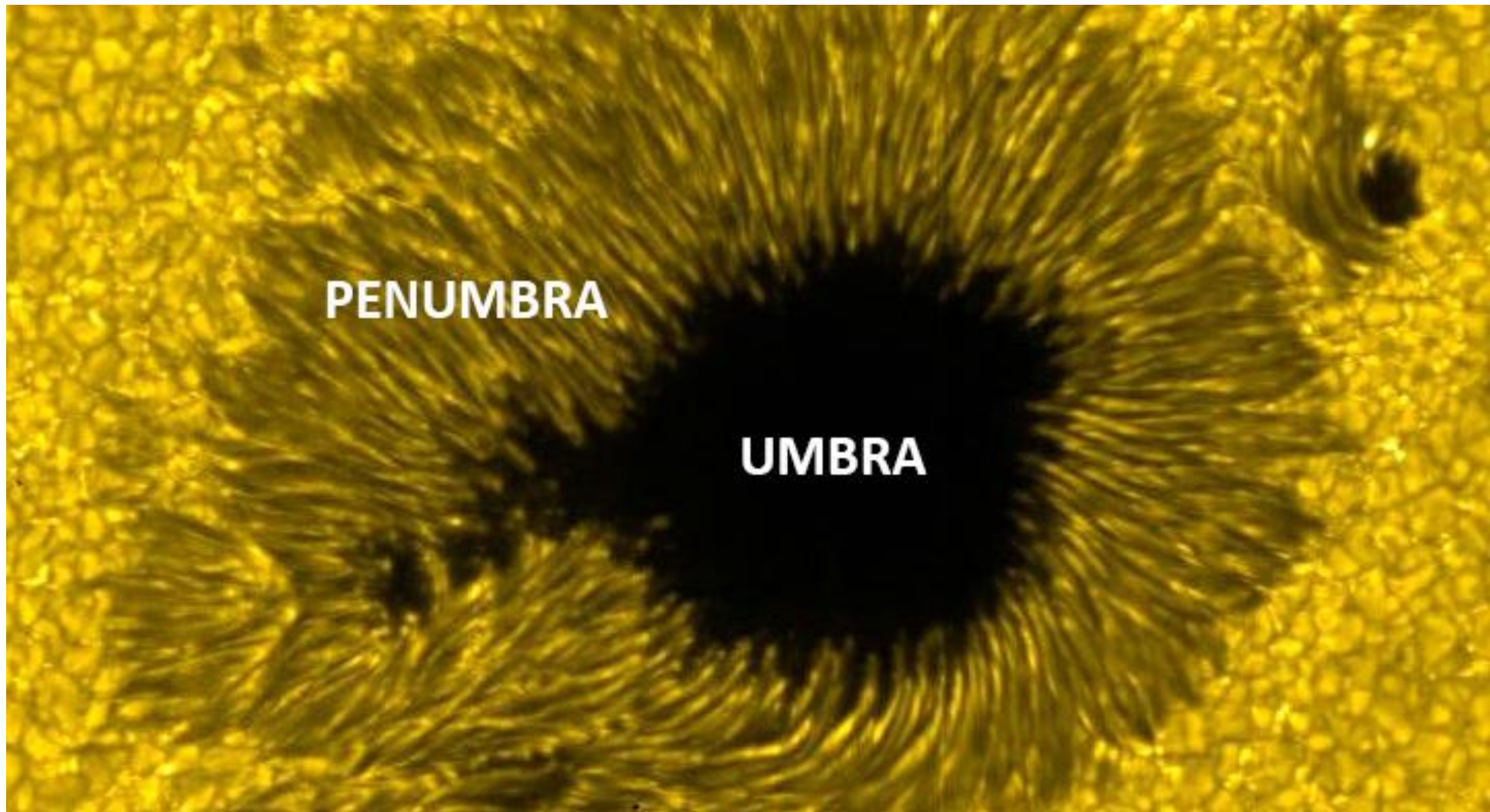
10km to 10,000 km in size.

Caused by concentration of the sun's magnetic field.

They last from a few days to a few months.

Solar flares and coronal mass ejections occur from sunspot regions.

The max and min number of sunspots cycles over roughly 11 years.



PENUMBRA

UMBRA

The sun's rotation

- Sidereal rotation – 24.47 days
- Synodic rotation – 26.24 days

- 36 days at the poles

- Astronomers can use the observation of the location of sunspots to measure this.