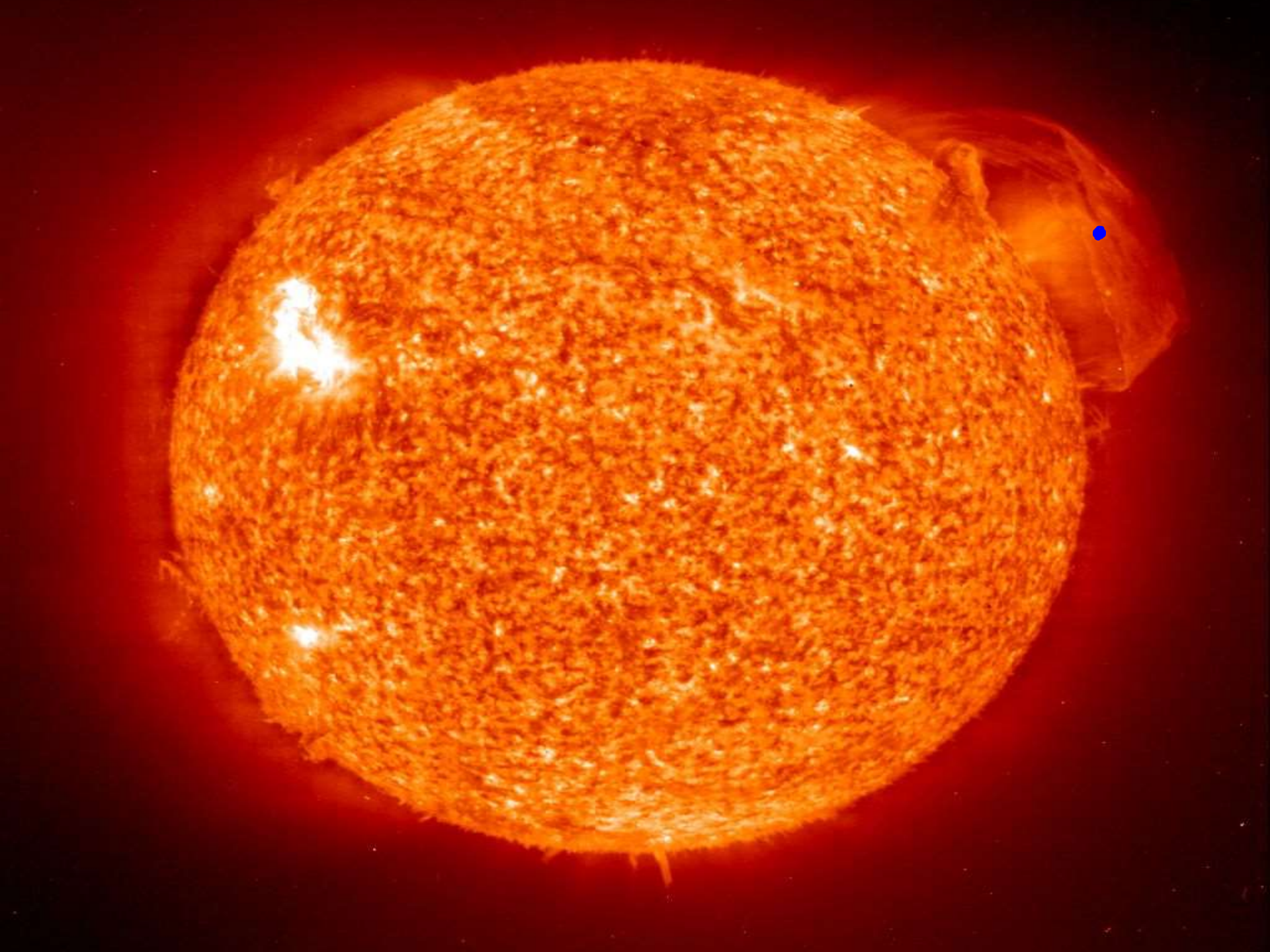
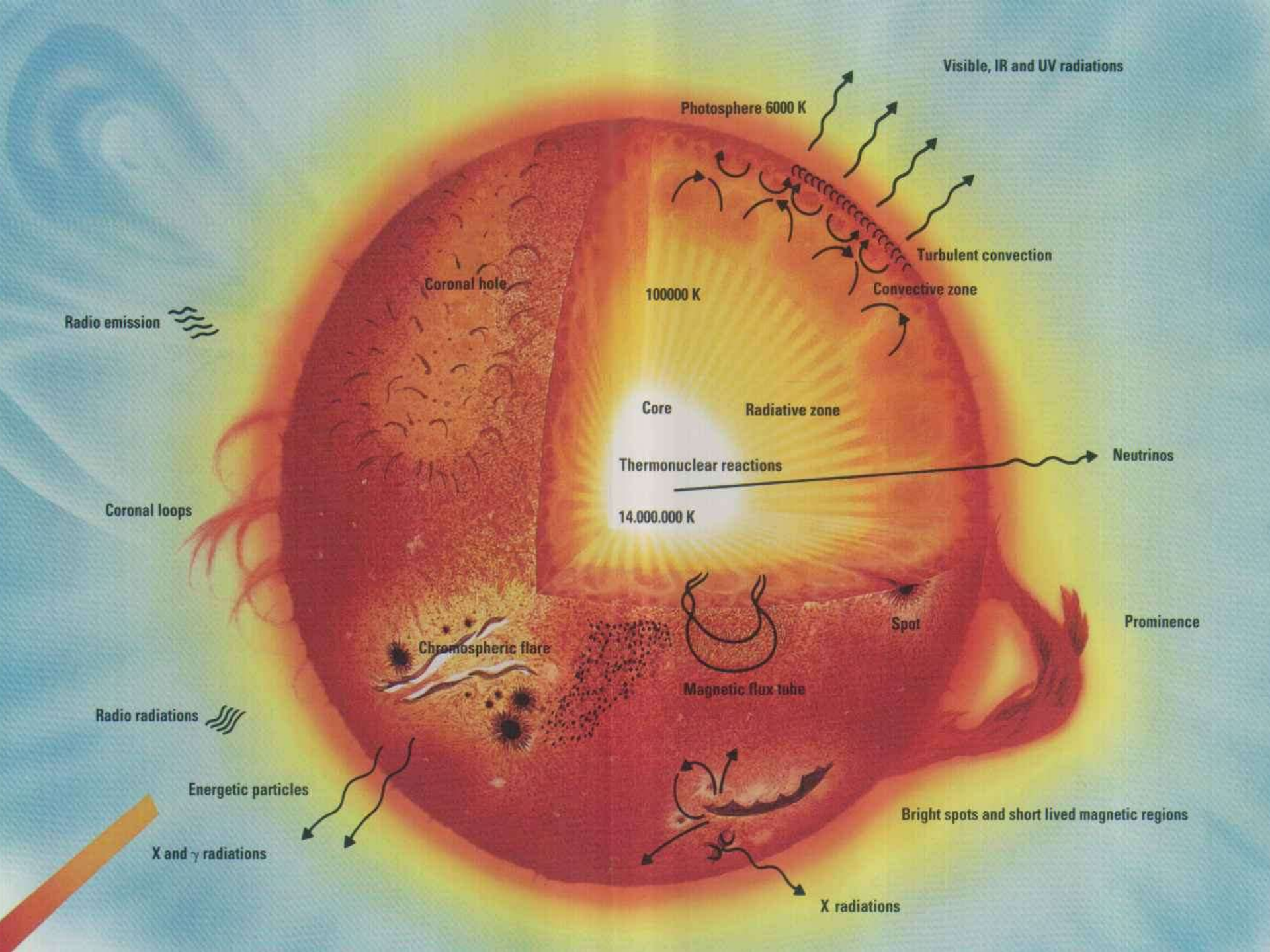
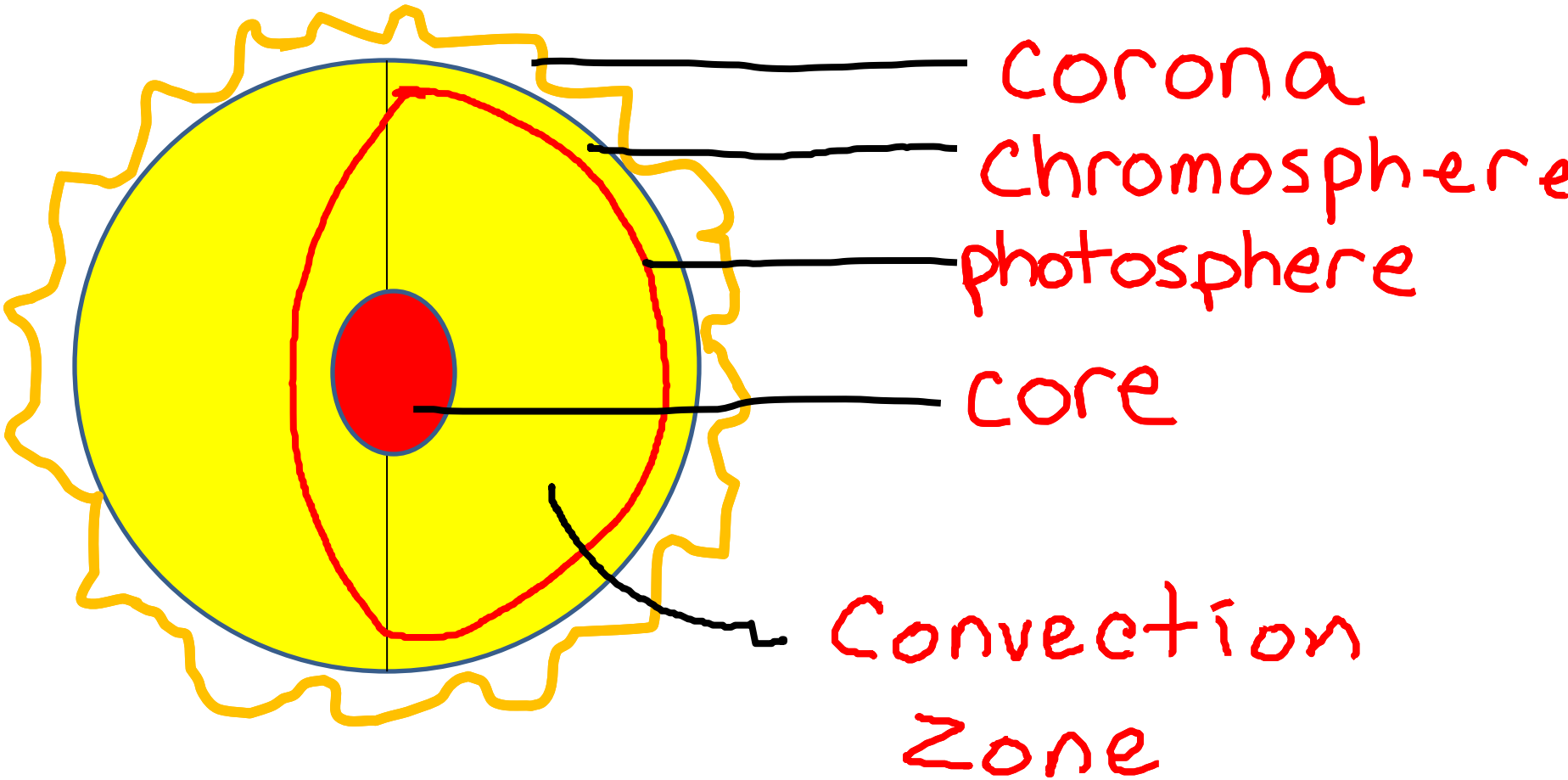
Sun

Mr. Skirbst

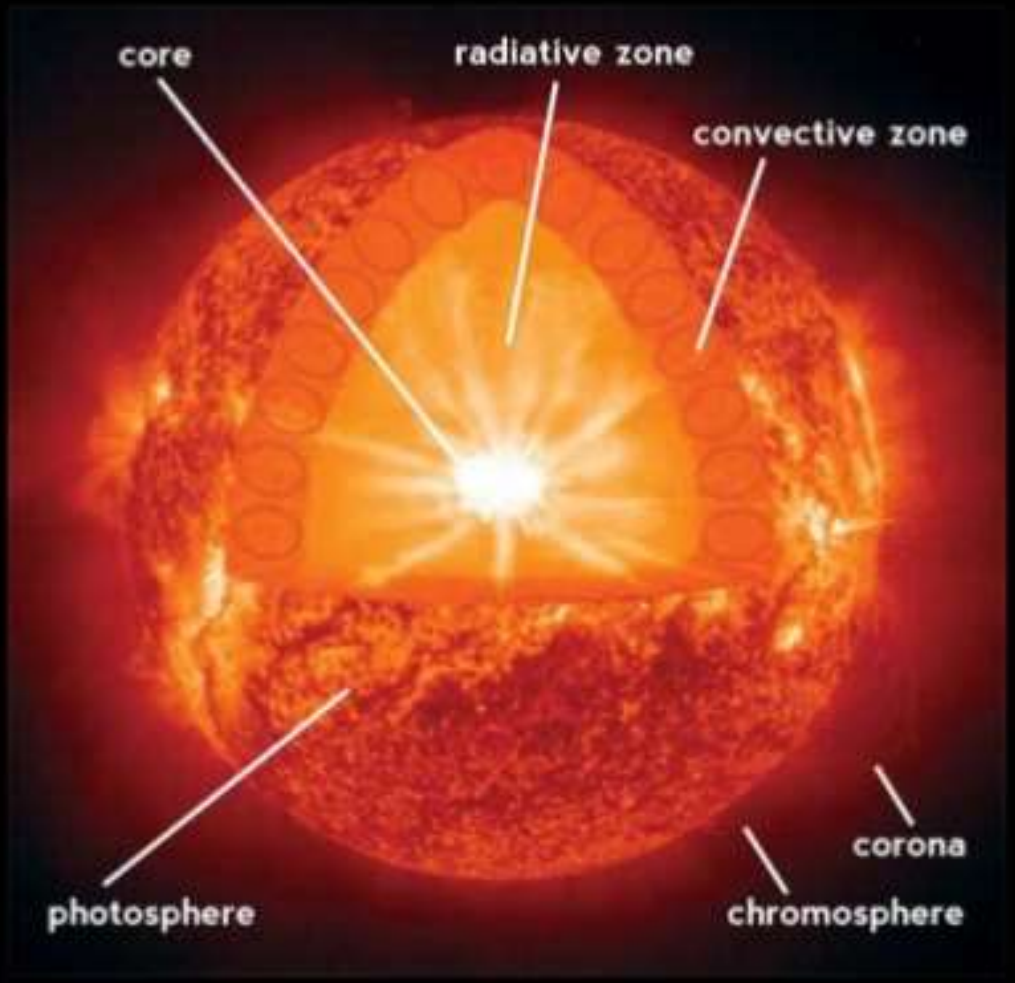



Visible, IR and UV radiations
Photosphere 6000 K
Turbulent convection
Convective zone
Coronal hole
100000 K
Radio emission
Core
Radiative zone
Thermonuclear reactions
Neutrinos
Coronal loops
14.000.000 K
Spot
Prominence
Chromospheric flare
Magnetic flux tube
Radio radiations
Energetic particles
Bright spots and short lived magnetic regions
X and γ radiations
X radiations

Sun's Structure



Sun's Atmosphere

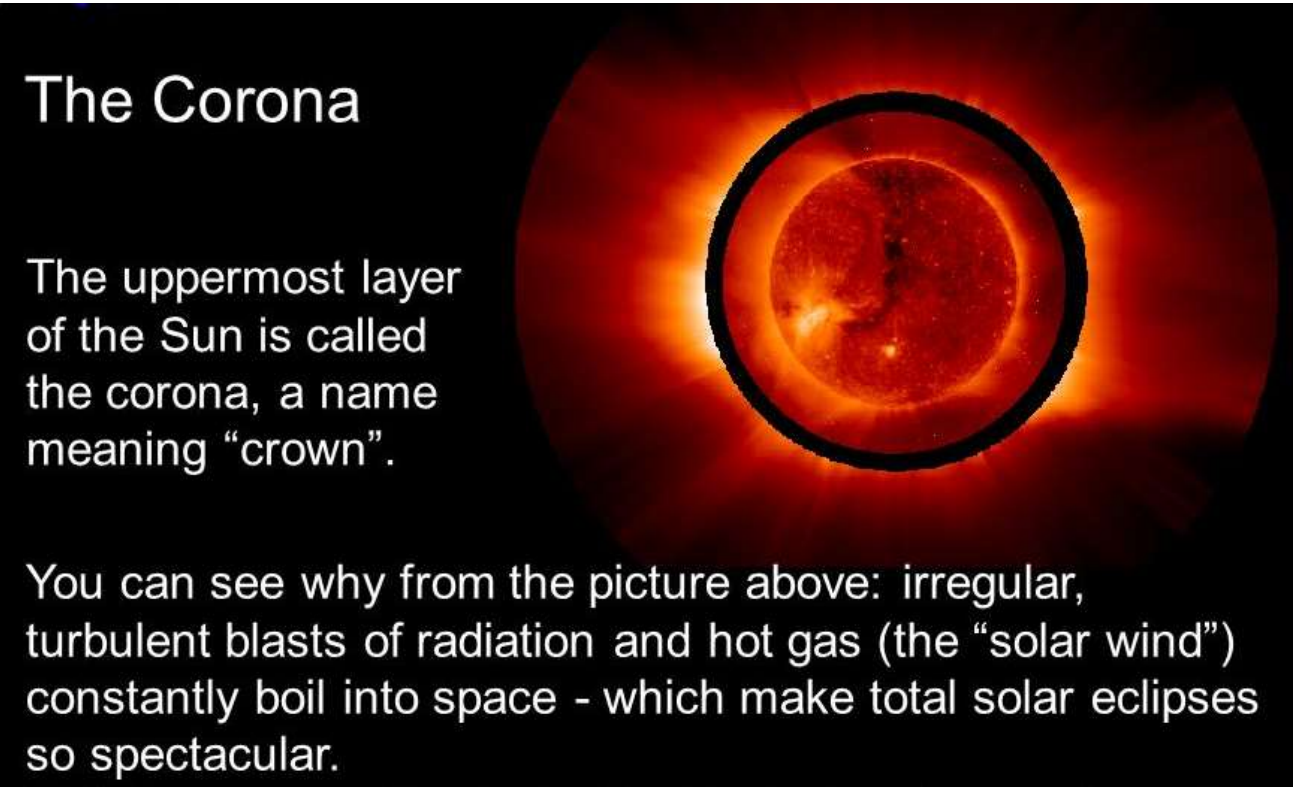


Three layers

- Photosphere
  - Most of sun's light comes from this layer
  - 400 km thick
  - 5,527°C
- Chromosphere
  - More helium, redish
  - 2,500km thick
  - 29,727°C
- Corona
  - Visible during eclipse
  - Several million km thick
  - 1-2 million degrees C

Corona

outermost layer of sun's atmosphere – means "crown"



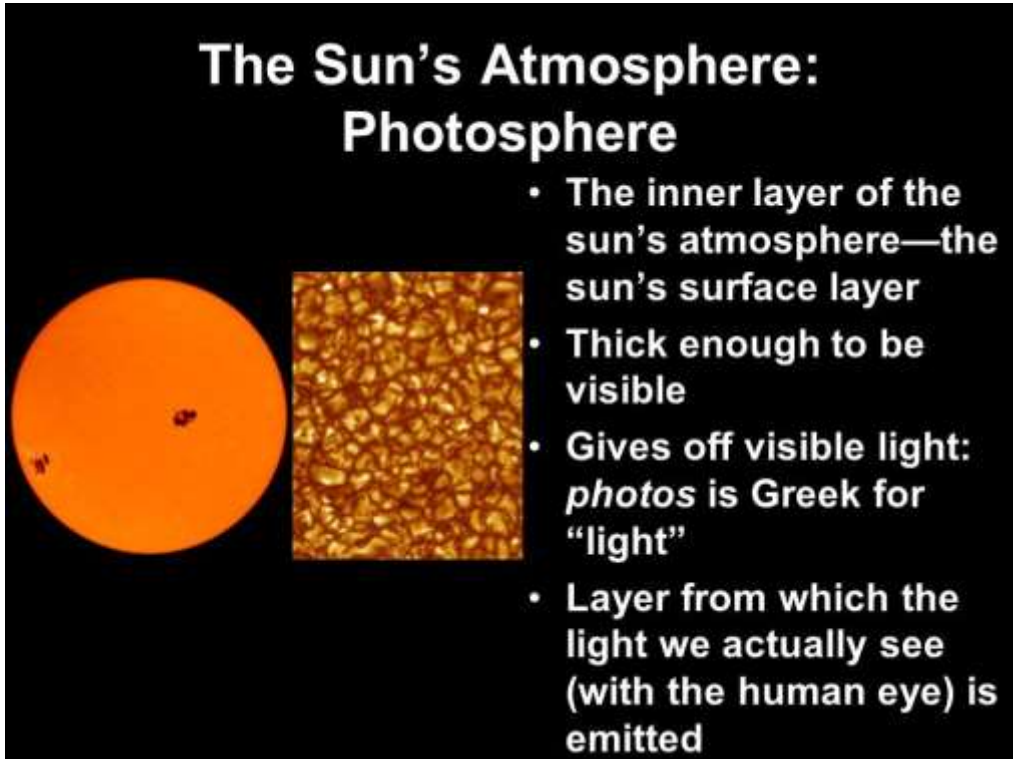
Chromosphere

middle atmosphere – "chromo" means color

Photosphere

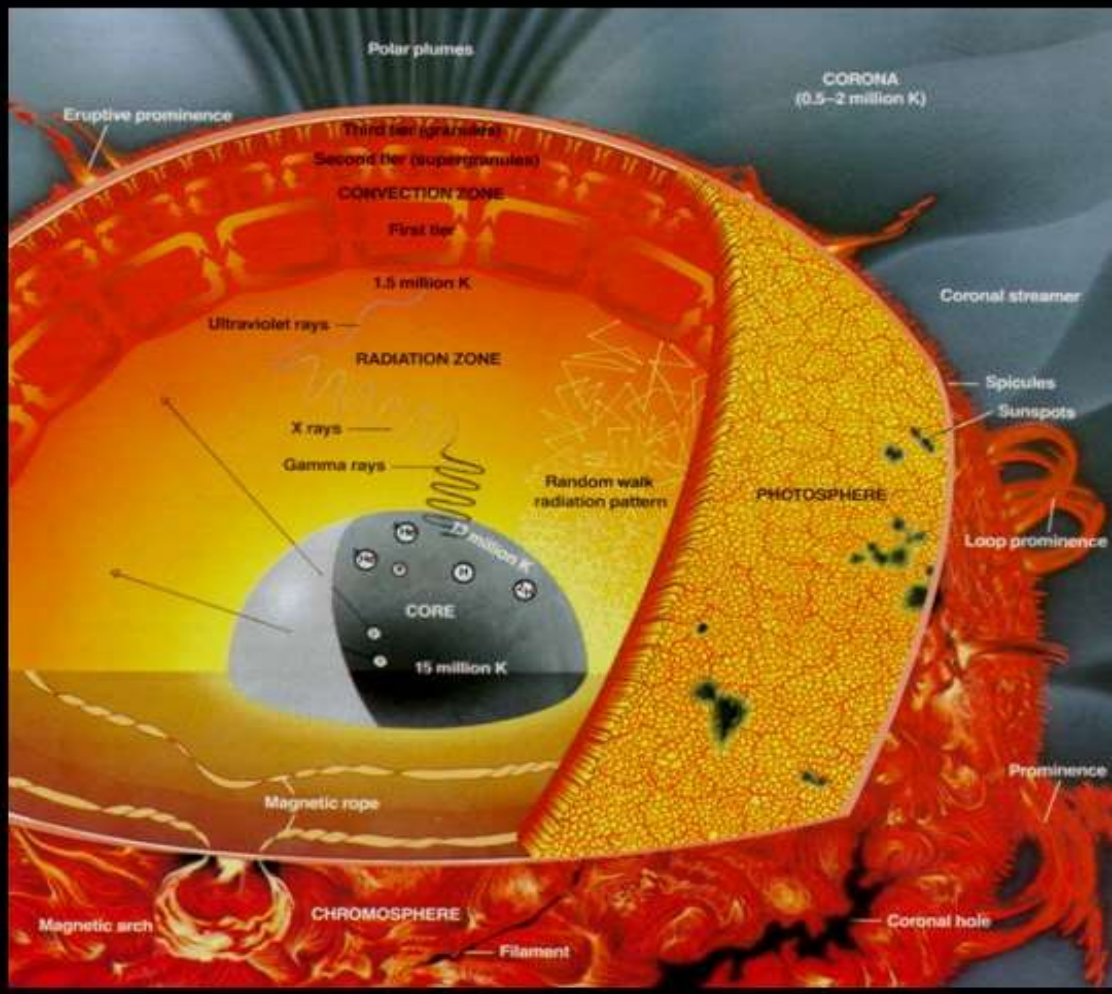
“surface” of the sun –

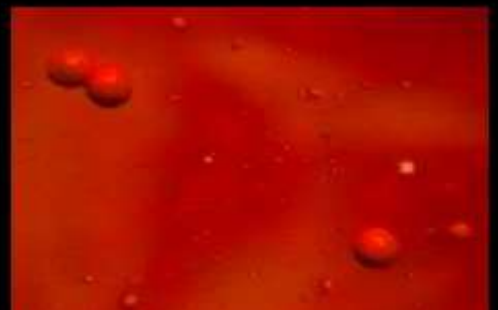
“photo” means light



Sun’s Internal Structure

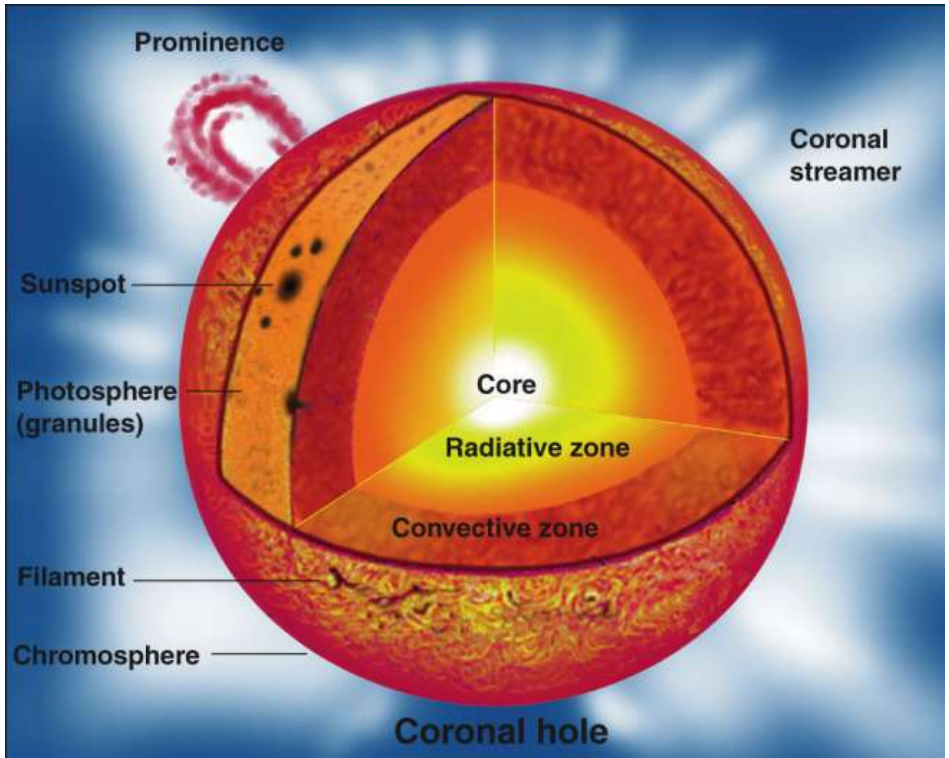
- Core
  - Where the energy is created.
  - Every second, nuclear reactions convert about 700 million tons of hydrogen into helium.
- Radiation Zone
  - Where energy is carried by radiation.
- Convection Zone
  - Energy transported by convection (just like boiling soup) where heat is transported to the photosphere.





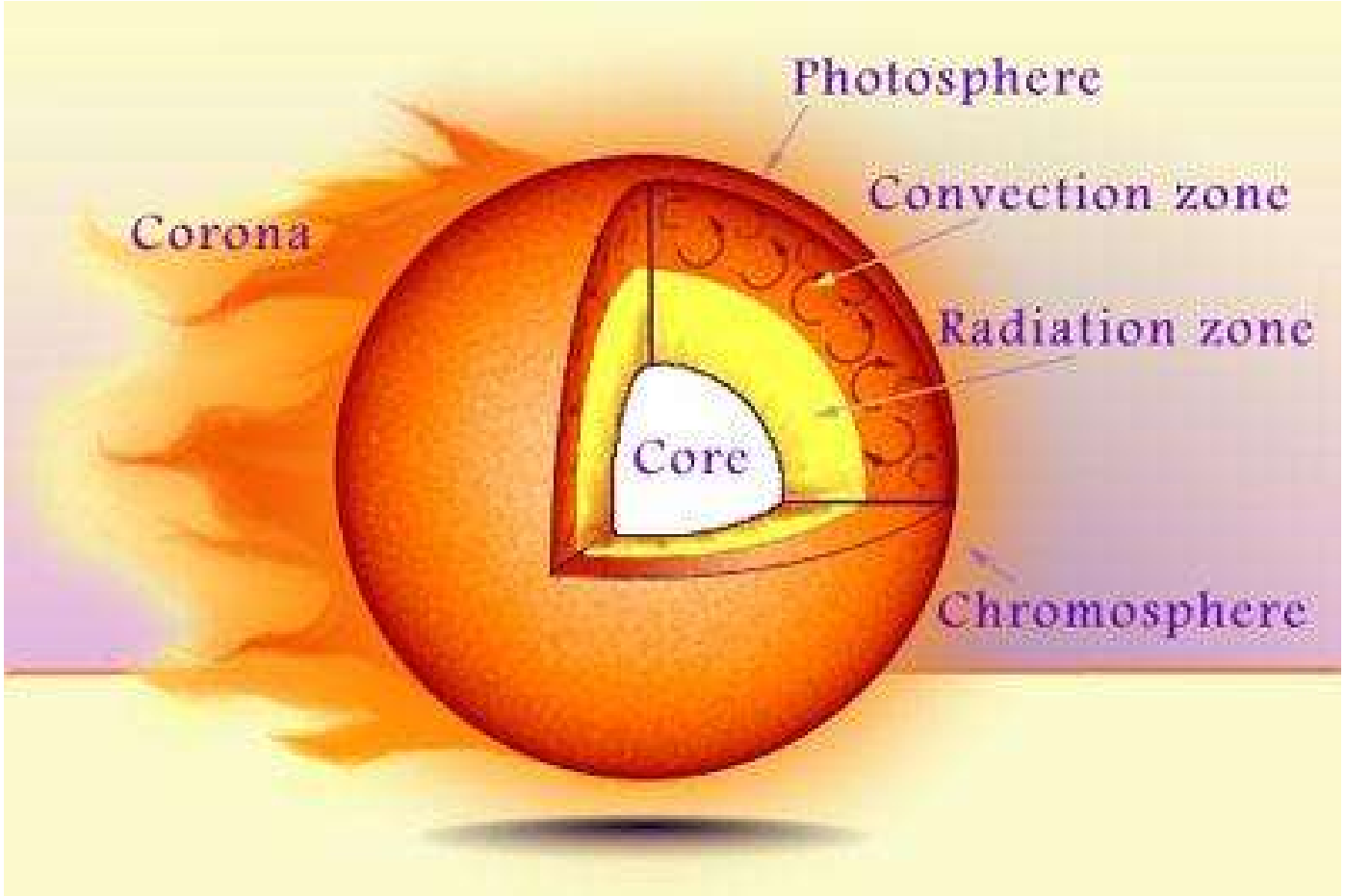
Convection Zone

energy carried by convection – <u>like</u> boiling water



Radiation Zone

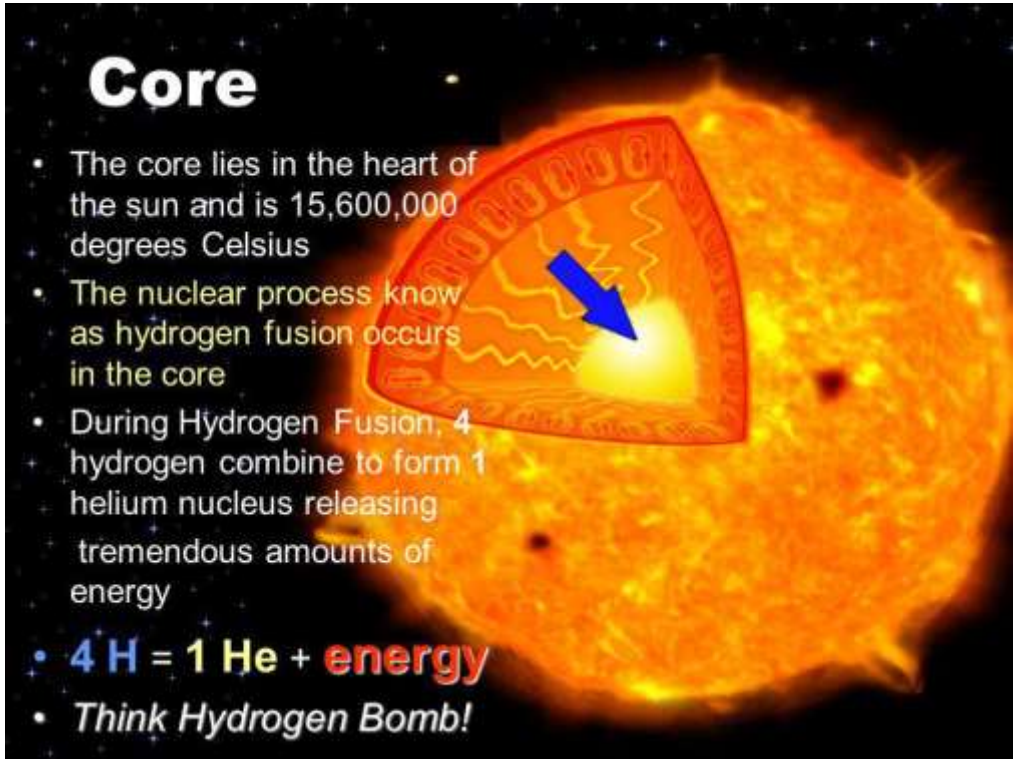
energy carried by radiation



Core

place of nuclear fusion –

hottest place – hydrogen forms helium



Sun Temperatures

Sun Temperatures

Core = > 15,000,000 °C

Sun Temperatures

Core = > 15,000,000 °C

Photosphere = 6,000 °C

Sun Temperatures

Core = > 15,000,000 °C

Photosphere = 6,000 °C

Chromosphere = 27,800 °C

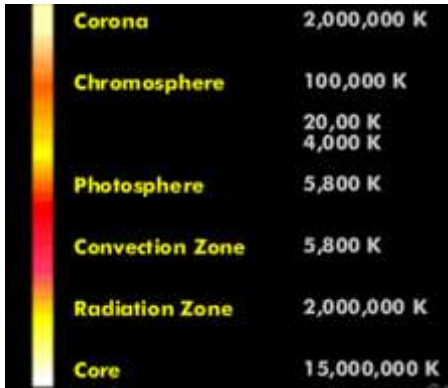
Sun Temperatures

Core = > 15,000,000 °C

Photosphere = 6,000 °C

Chromosphere = 27,800 °C

Corona = 1,700,000 °C



Solar Activity

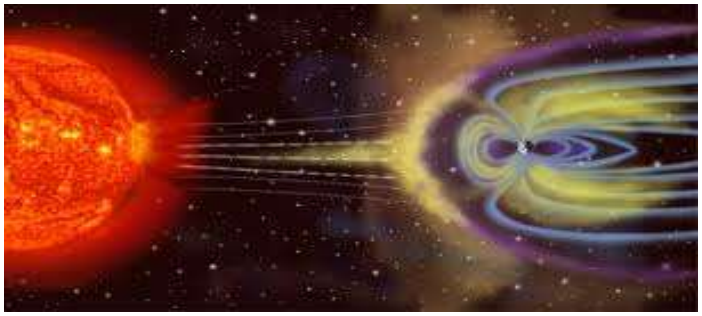
Prominence

Solar Flare

Sunspots

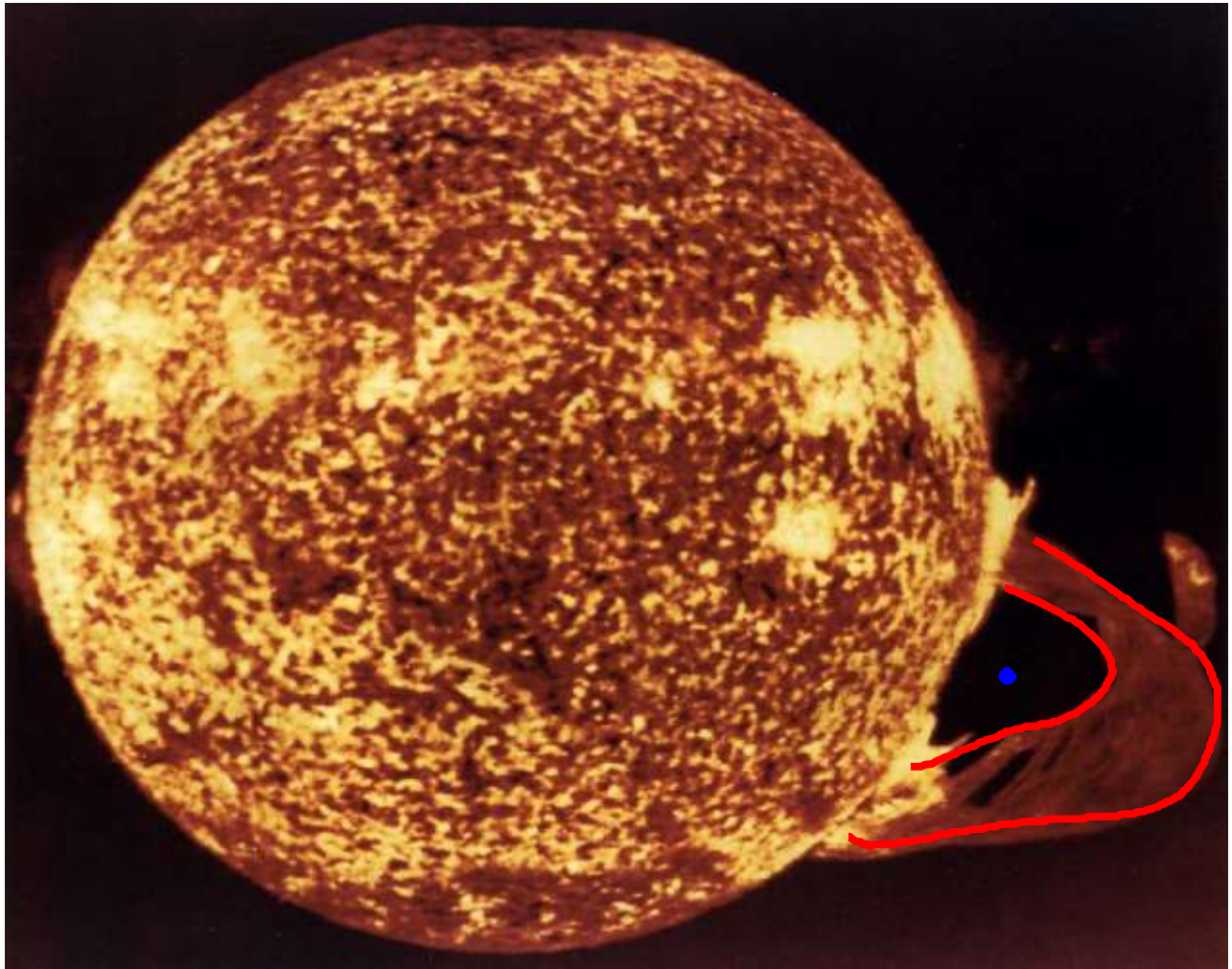
Solar Wind

CMEs



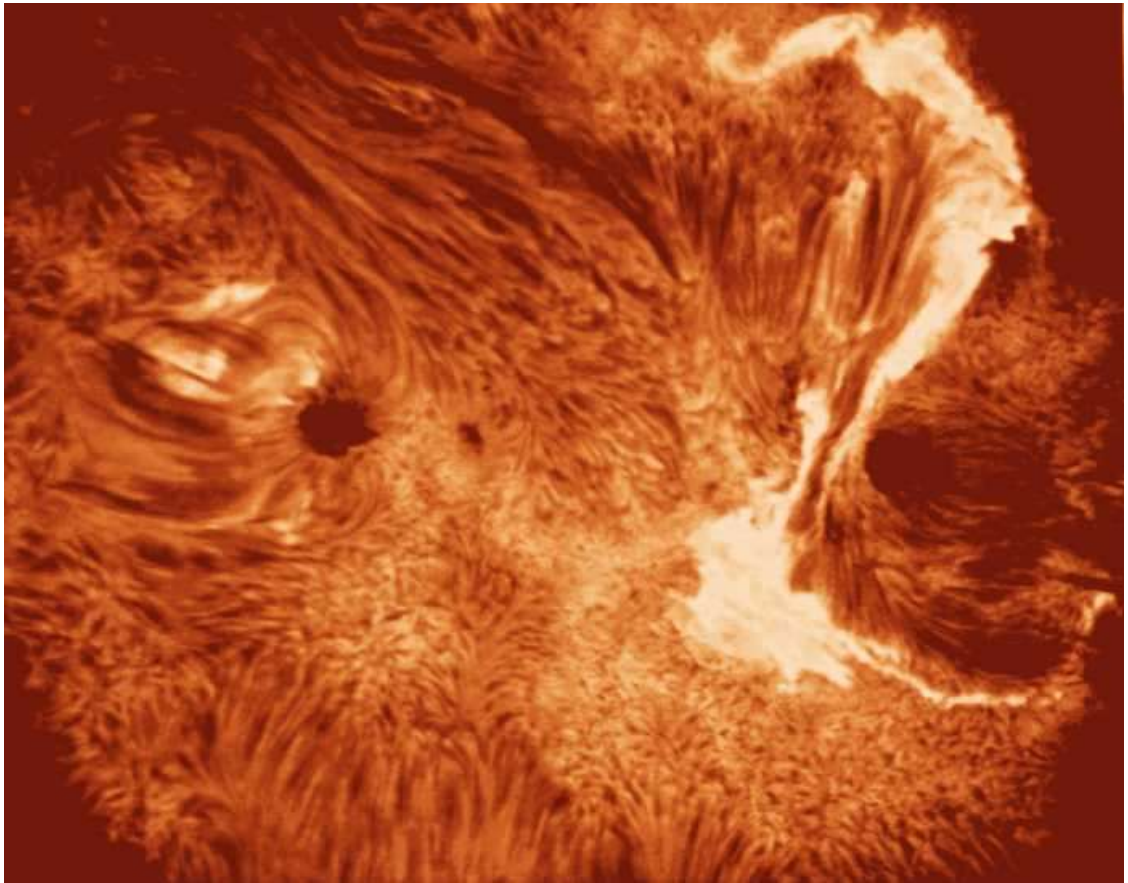
Prominence

huge bright arches or loops of gas



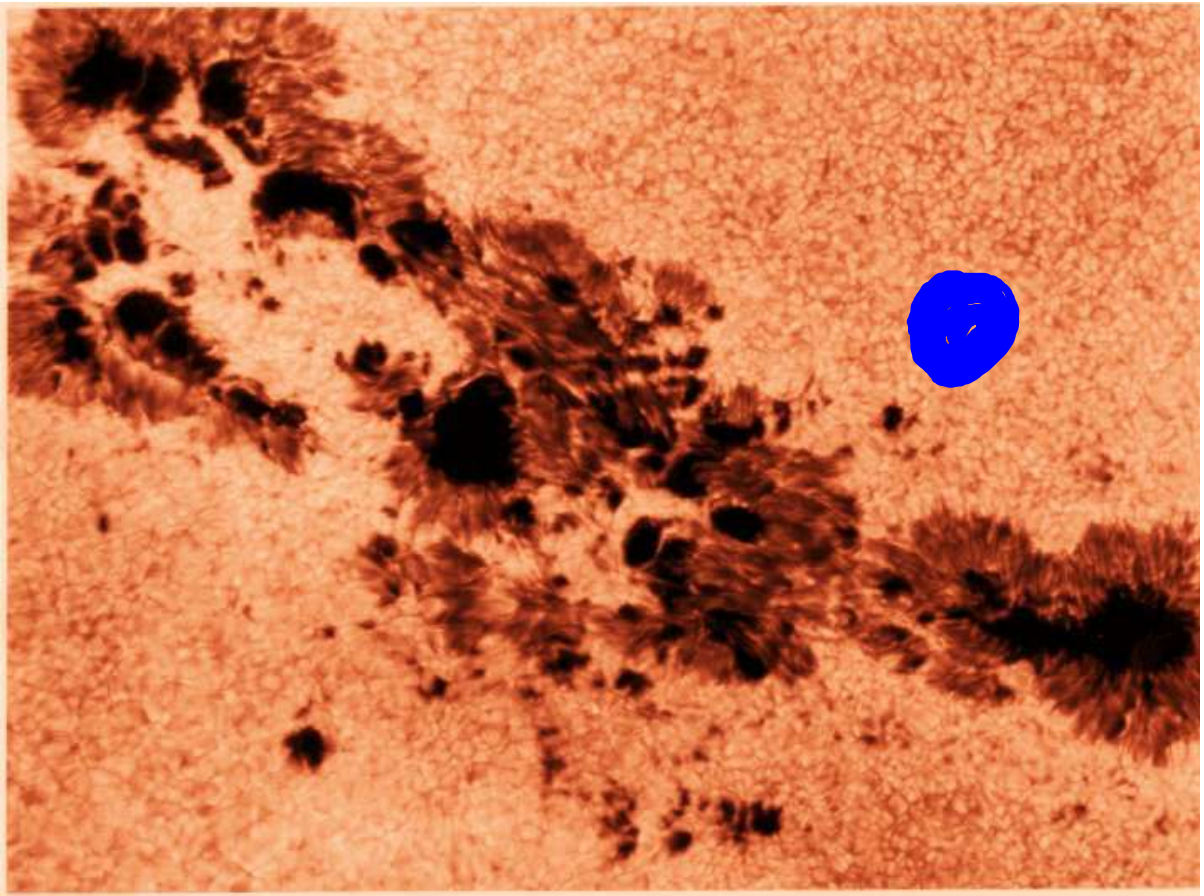
Solar Flare

burst of light on photosphere (temp 2x – bright & hot)



Sunspots

dark, cooler areas on sun's surface (solar storms)



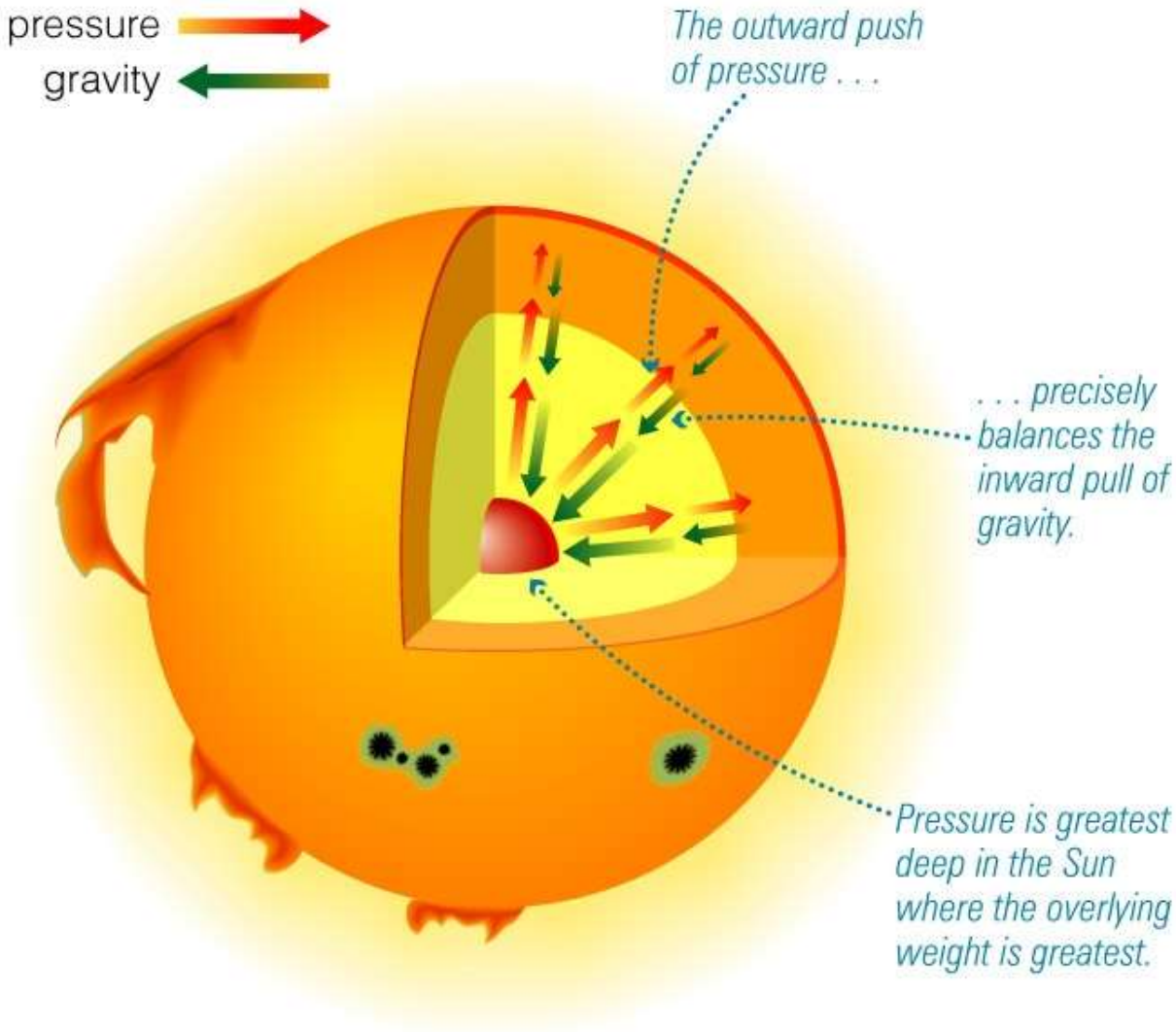
Solar Wind

continuous stream of high energy from corona

Coronal Mass Ejection (CME)

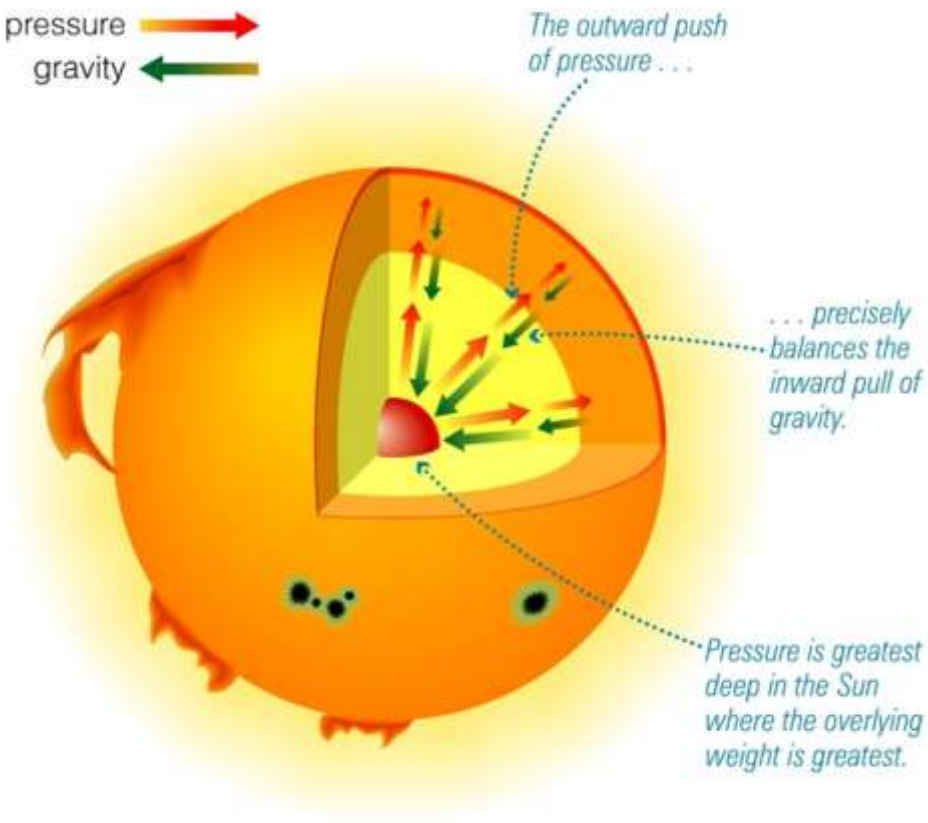
unusually large release of plasma and magnetic field from corona

Life Cycle of Sun



Life Cycle of Sun

10 billion-year “battle of the bulge”

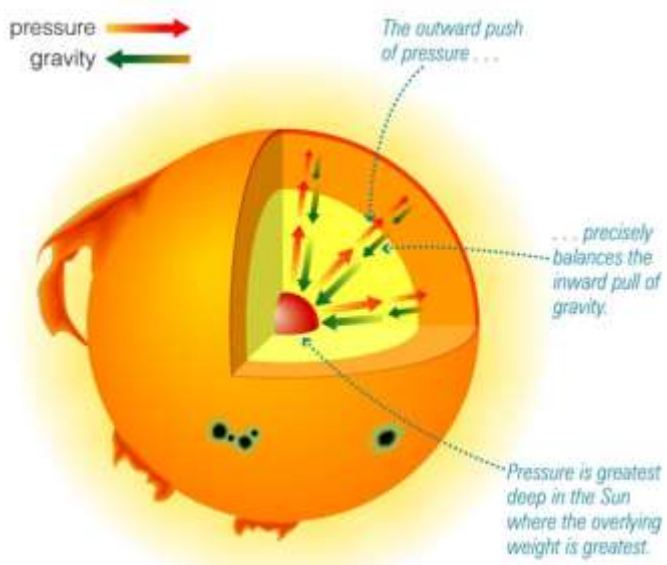


Life Cycle of Sun

10 billion-year "battle of the bulge"

pressure vs. gravity:

powered by nuclear fusion



Life Cycle of Sun

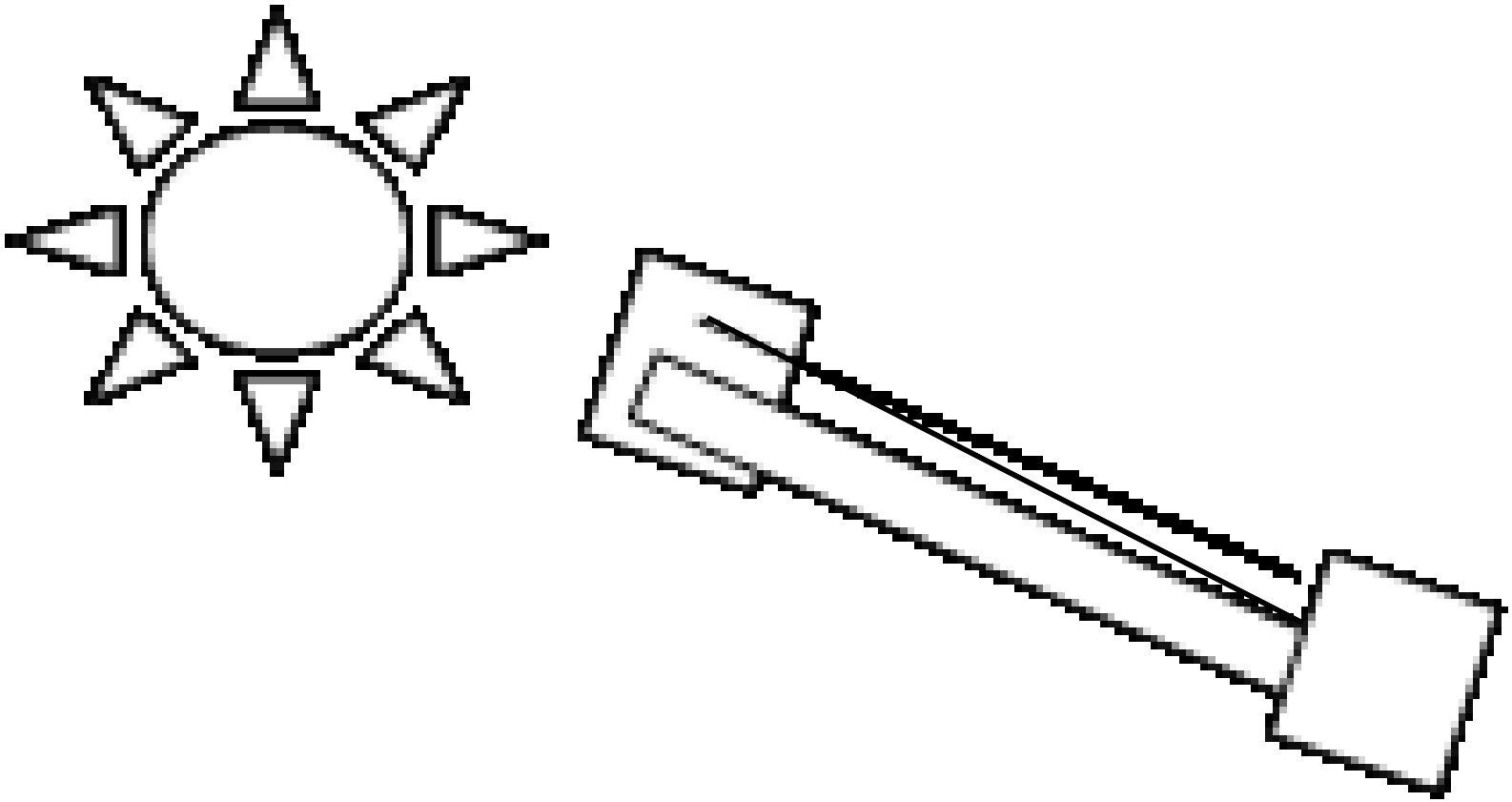
10 billion-year “battle of the bulge”

pressure vs. gravity:

powered by nuclear fusion

when fuel runs out, gravity wins

How Big is the Sun?



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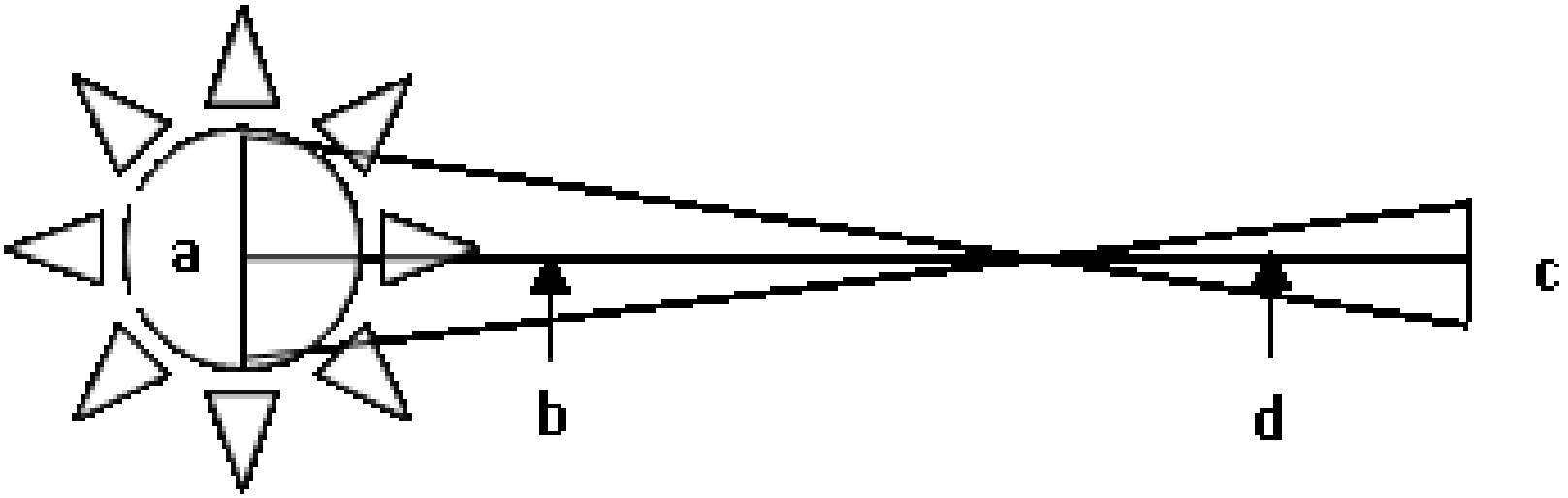

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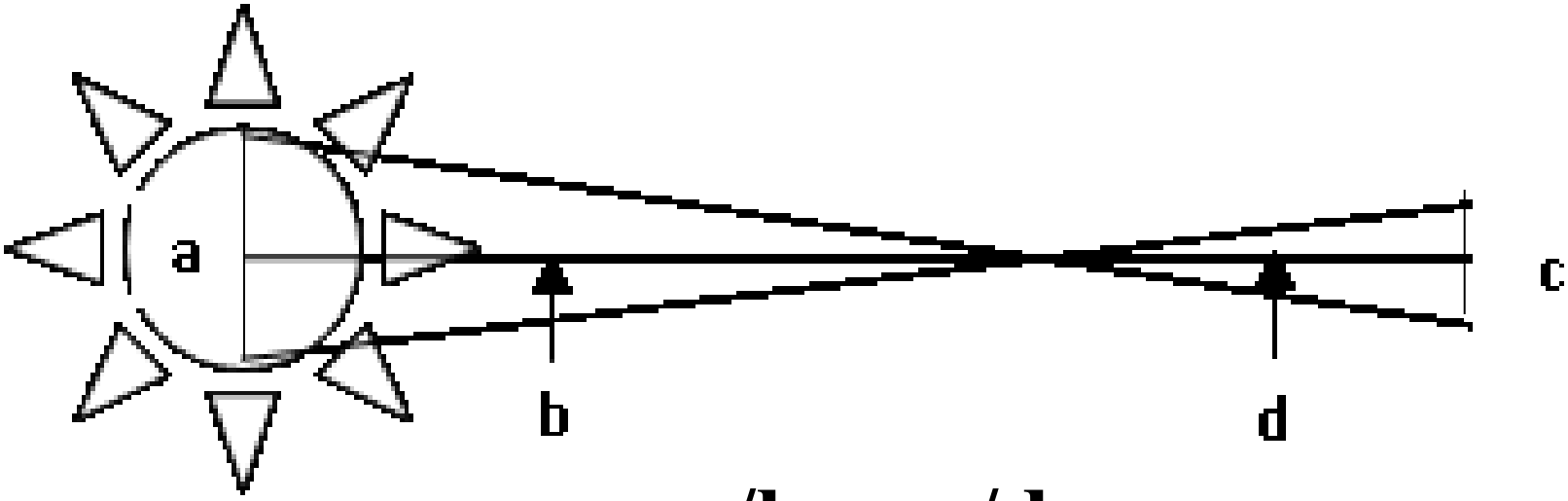


a/b = c/d

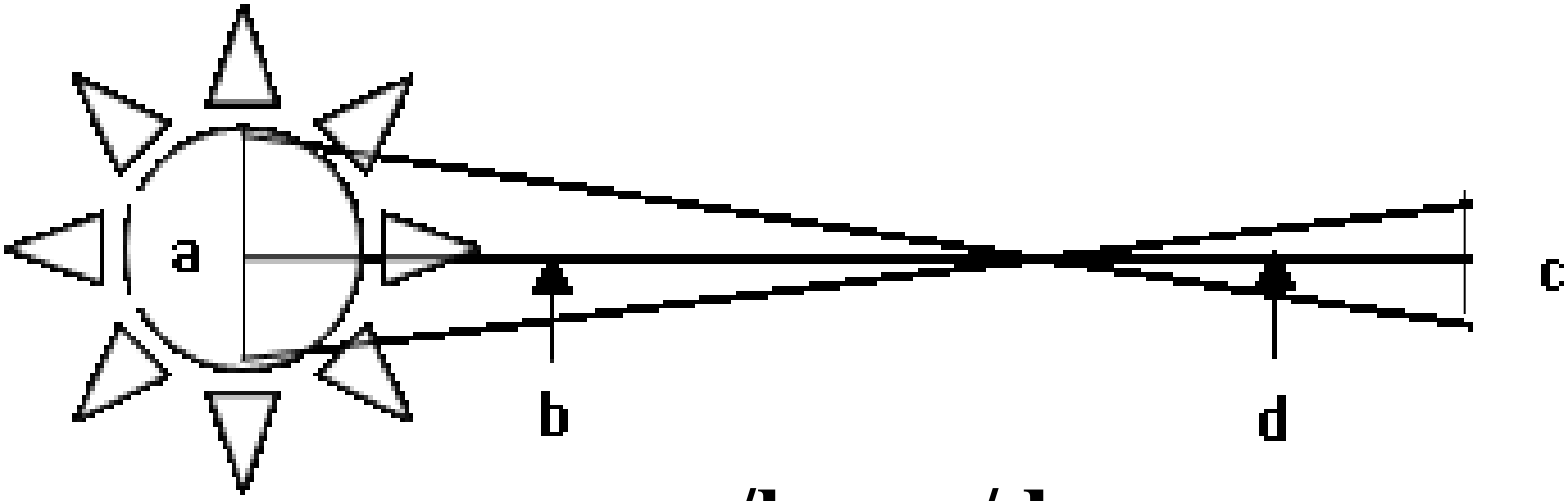
a =

b =

c =

d =

How Big is the Light?



a/b = c/d

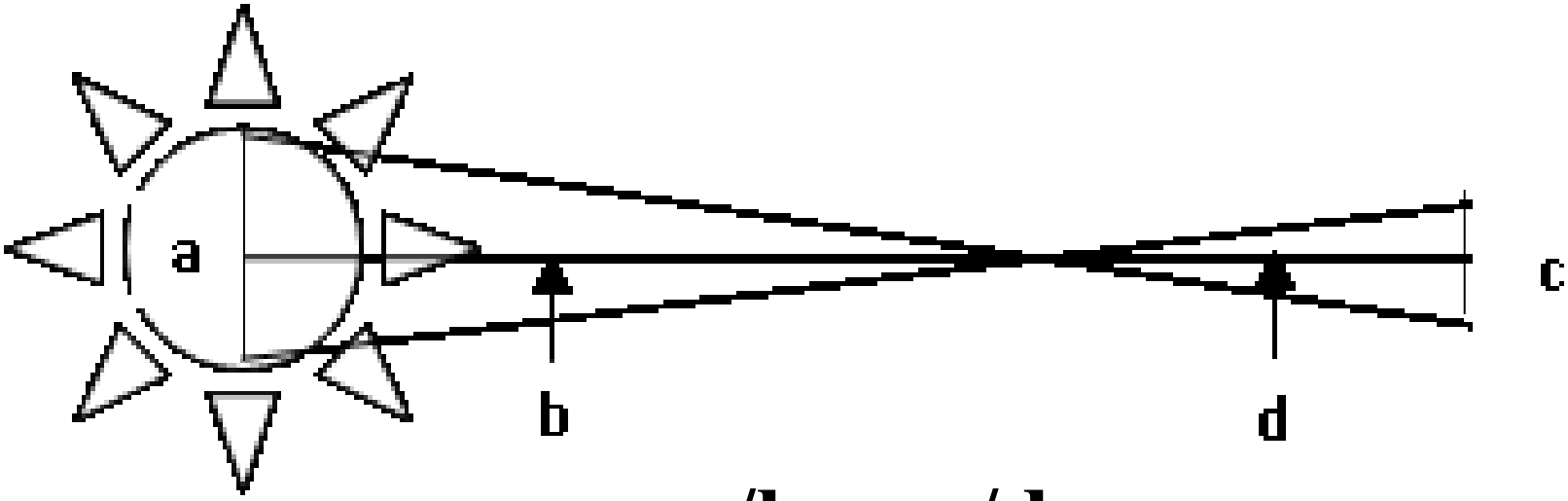
a = *X* cm

b = 1000 cm

c = 0.1 cm

d = ___ cm

How Big is the Light?



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a = *X* cm

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$$\frac{X}{1000} = \frac{0.1}{}$$