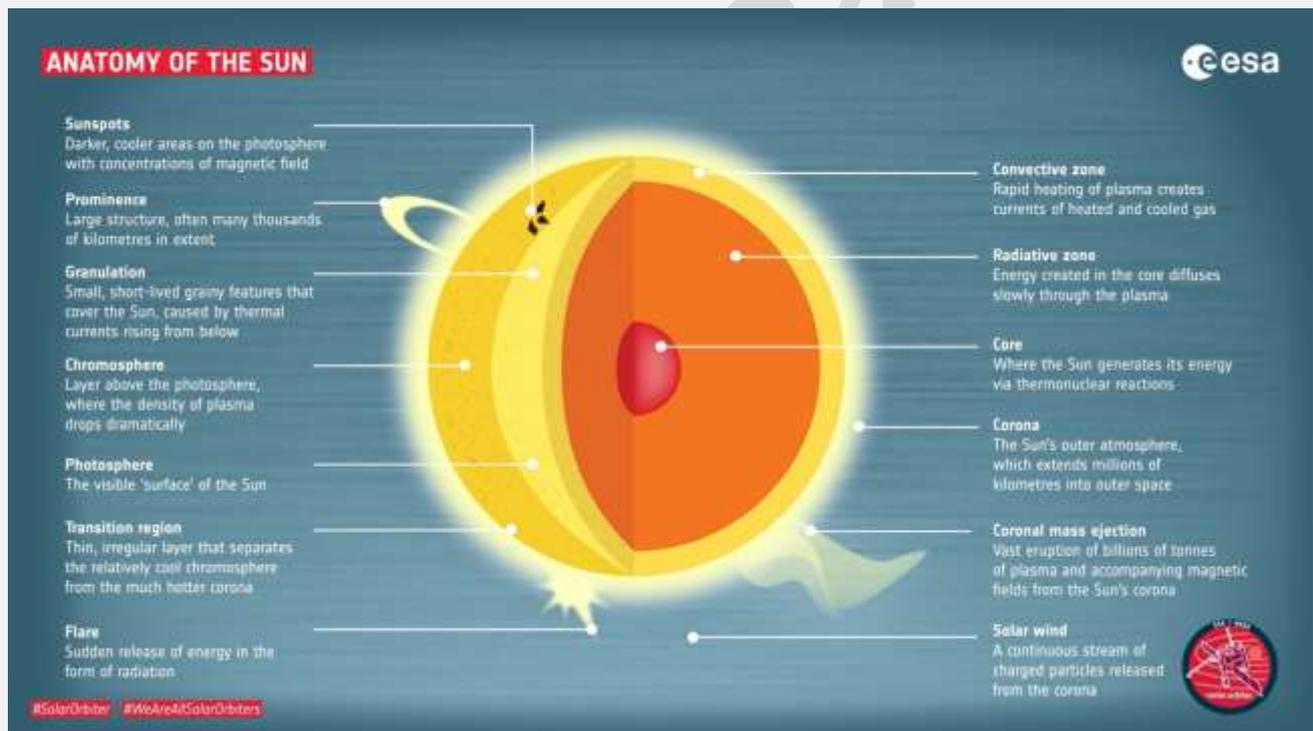


THE SUN

- **Age:** ~4.6 billion years
- **Diameter:** ~1.39 million km
- **Surface Temperature:** ~6000 °C
- **Core Temperature:** ~16 million °C
- **Mass:** ~3,32,900 times Earth
- **Composition:** ~98% Hydrogen & Helium
- **Gravity:** 274 m/s² (≈28× Earth)
- **Rotation Period:** ~25 days 9 hours (differential rotation)
- **Rotation Direction:** Counter-clockwise (viewed from above Earth's North Pole)
- **Solar System Mass:** ~99.8% concentrated in the Sun

Note: *Despite its huge mass, the Sun has only ~2% angular momentum due to its gaseous nature.*

INTERNAL STRUCTURE OF THE SUN



1. Core

- Innermost region
- Site of **nuclear fusion** (Hydrogen → Helium)
- Source of **solar energy**

2. Radiative Zone

- Energy is transferred outward by **radiation**
- Photons take thousands of years to escape

3. Convective Zone

- Energy transferred by **convection currents**
- Hot plasma rises, cooler plasma sinks

ATMOSPHERIC LAYERS OF THE SUN

1. Photosphere

- Visible “surface” of the Sun
- Emits most solar radiation
- Temperature: ~6000 °C
- **Sunspots occur here**

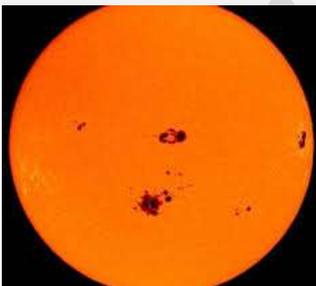
2. Chromosphere

- Thin layer above the photosphere
- Temperature: ~4320 °C
- Appears reddish during solar eclipses

3. Corona

- Outermost atmosphere
- Temperature: ~1 million °C
- Extends millions of km into space
- Source of **Solar Wind**
- Visible during a **total solar eclipse**

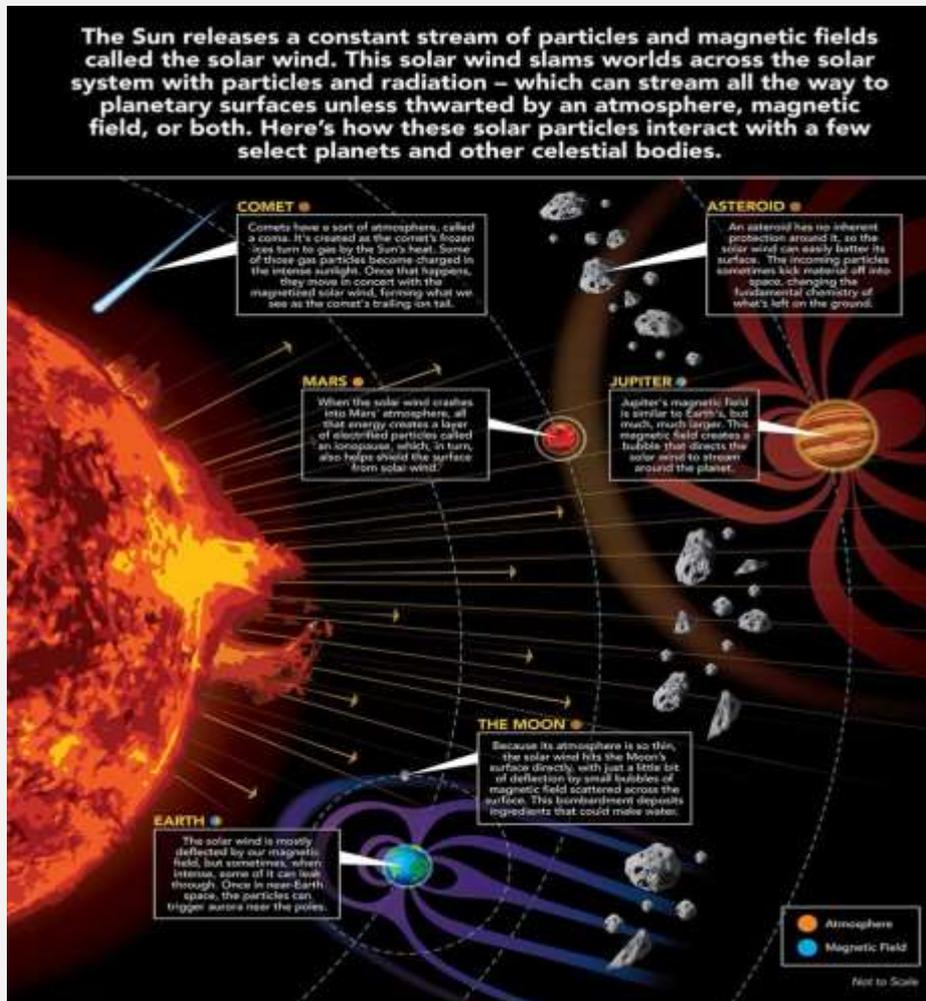
SUNSPOTS



- Dark patches on the **photosphere**
- Cooler (500–1500 °C less than surroundings)
- Caused by **strong magnetic fields inhibiting convection**
- Have:
 - **Umbra** (dark center)
 - **Penumbra** (lighter outer region)
- **11-year sunspot cycle**
 - **Solar Maximum** → high sunspots
 - **Solar Minimum** → low sunspots

- Linked to **solar storms & climate variations**

SOLAR WIND



- Continuous outflow of **charged particles (plasma)**
- Originates from the **corona**
- Speed: up to **900 km/s**
- Temperature: ~1 million °C
- Main components: **electrons & protons**

Impacts:

- Causes **auroras**
- Can disrupt **satellites, GPS, and power grids**

PLASMA

- Fourth state of matter

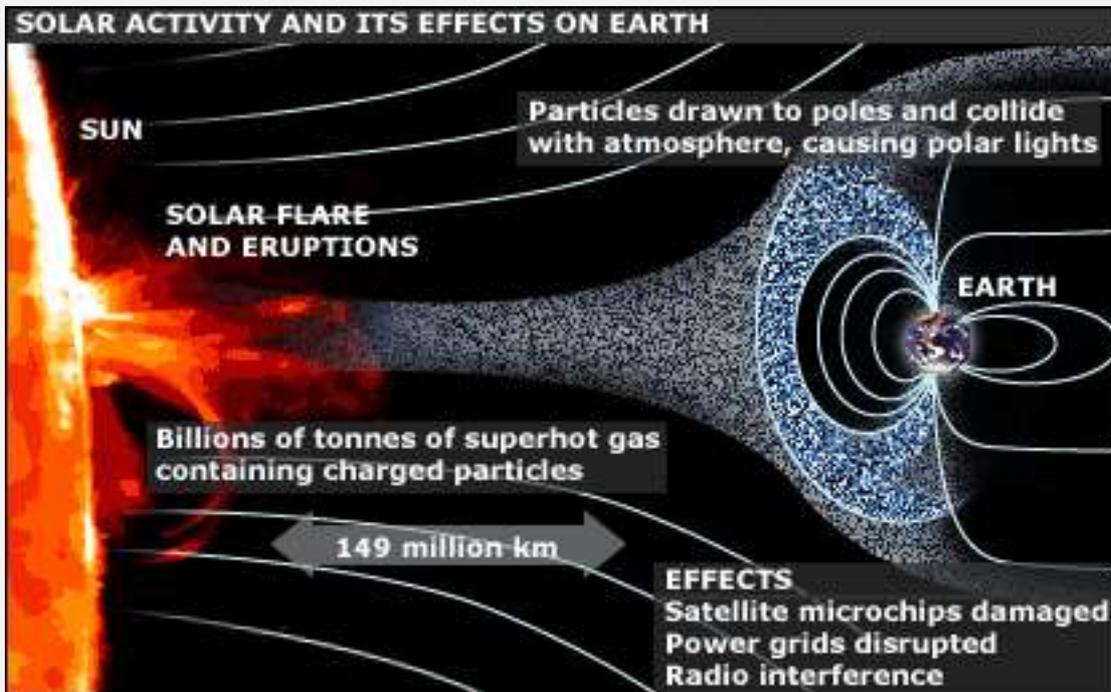
- Ionised gas (free electrons + ions)
- Examples:
 - Lightning
 - Electric sparks
 - Neon lights
 - Solar wind

AURORA



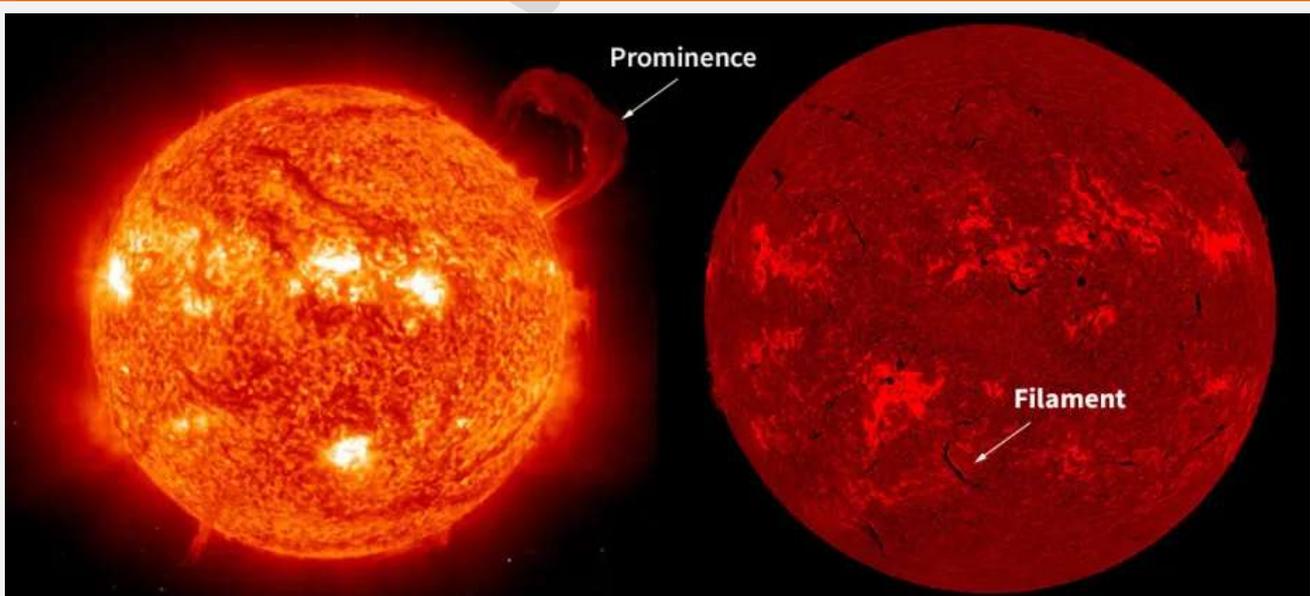
- Natural light display near **polar regions**
- Caused when solar wind particles interact with Earth's **magnetic field & atmosphere**
- Types:
 - **Aurora Borealis** (North)
 - **Aurora Australis** (South)

SOLAR FLARES



- Sudden **magnetic explosions** on the Sun
- Extremely bright
- Heat corona to **10–20 million °C**
- Can cause:
 - Radio blackouts
 - Satellite damage

SOLAR PROMINENCE



- Large **arc of glowing gas**

- Anchored by magnetic fields
- Can extend hundreds of thousands of km
- Last for **months**

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