



# Solar Wind

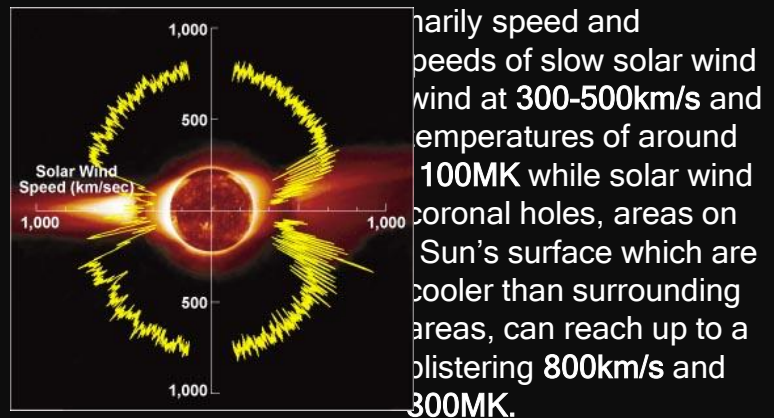
Aarush Pethe

Westminster School, London, SW1P 3PB



## Introduction

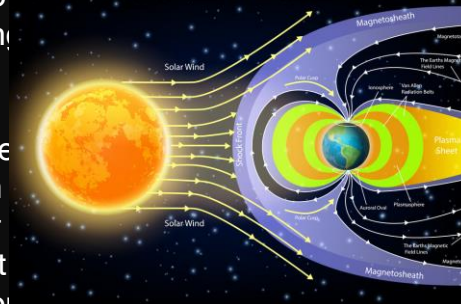
Solar wind is a continuous, plasma stream of subatomic, charged particles emitted by the upper atmosphere of the Sun, the **corona**. Among these particles include protons, electrons and alpha particles, many of which have been stripped of the two main elements in the Sun, **hydrogen and helium**. The occurrence of solar wind is due to high temperatures, which can **well exceed 1 million degrees Celsius**, in the corona heating up **protons, electrons, and nuclei** and exciting them to such an extent that they can escape the gravitational pull of the Sun. There are two main states of solar wind, fast and slow.



parily speed and speeds of slow solar wind at **300-500km/s** and temperatures of around **100MK** while solar wind coronal holes, areas on Sun's surface which are cooler than surrounding areas, can reach up to a blistering **800km/s** and **300MK**.

## Effects on Humans

While the solar wind may sound like a powerful and potentially dangerous force, does it truly present any danger to humans? Luckily for us, solar wind is not a significant threat that we should be cautious of, apart from in very rare cases such as the **1859 'Solar Superstorm'**. This is primarily due to the presence of the Earth's magnetic field which causes particles from the solar wind to be deflected away by what is known as the **Lorentz Force**. Furthermore, the **magnetosphere** causes the particles to be opposed to bombarding the Earth. To the contrary, we instead get to enjoy the sites of the aurorae in the northern and southern lights, due to the solar wind. The major threat is not to humans but to our technology, solar wind itself can cause fluctuations in celestial radio waves in the process of **interplanetary scintillation**, and the charged particles of **CMEs**, which are produced by powerful solar storms can slam into our orbit which can cause; satellite disruption or failure, exposing high-flying airplanes to radiation, disruption of telecommunication and navigation, effects to power



## Aims for the Future

In the future, we aim to further our understanding of the solar wind and particularly to increase our knowledge of how the slow solar wind is formed as well as to be able to better prepare for if another freak 'Solar Superstorm' hits us. Working towards this aim, **NASA** have announced two new science missions, namely **HelioSwarm** and **Multi-slit Solar Explorer(MUSE)** which seek to study the sun's corona and measure the magnetic field of the solar wind.

## Sources

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