

# Physics of the inner heliosphere

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The Sun enables almost all life on Earth, but as a dynamic plasma object, it can also have damaging effects, called “space weather,” through variations in the solar wind and energetic particles that arrive at our planet.

We are about to enter a new era in the exploration of the Sun and its effects on interplanetary space: in August 2018, NASA’s Parker Solar Probe spacecraft launched and has already travelled closer to the Sun than we have ever been before and will ultimately reach just 10 solar radii and exploring for the first time the region where the solar wind is accelerated.

Tim Horbury is a member of the science team of the FIELDS instrument and in this project you will analyse data from the spacecraft, to address some key questions about the solar wind and how it is created:

- How is fine scale structure in the solar wind formed in the Sun’s corona?
- How is the Sun’s magnetic field connected into interplanetary space?
- How do waves and turbulence evolve as they travel away from the Sun?

In 2020, the Solar Orbiter spacecraft will launch and also travel into the inner solar system, carrying a magnetic field instrument built here at Imperial College. Later in the project, the work will use Solar Orbiter data to directly relate phenomena in the interplanetary medium to those seen on the Sun using Orbiter’s telescopes.

This is an exciting opportunity to be part of the discovery phase of two of the most exciting space missions for many years. The project will involve the analysis of data from the two spacecraft, as well as related theory and potentially modelling.

See <http://parkersolarprobe.jhuapl.edu/> for more information about the Parker Solar Probe mission and <http://sci.esa.int/solar-orbiter/> for Solar Orbiter.