

Formation and evolution of the solar wind

PhD project

Space & Atmospheric Physics Group
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The Sun's solar wind is a prototype for stellar winds, as well as being the driver of "space weather" which can dramatically affect our lives on Earth. It is also an excellent laboratory for collisionless plasma processes, such as shocks and turbulence, which occur throughout the Universe.

We are in an unprecedented era of exploration of the solar wind near the Sun, with NASA's Parker Solar Probe making encounters through the Sun's upper atmosphere, and ESA's Solar Orbiter rising to high latitudes to enable us to measure how different regions on the Sun produce solar winds. We have a major involvement in both missions – we built the magnetic field instrument for Solar Orbiter – and you will join a lively science team in the group studying solar wind science. By the time this project starts, Parker will have entered its key science phase, having reached its closest perihelion under 10 solar radii, and Solar Orbiter will be beginning its journey to higher latitudes.

In this project you will use data from both missions to study fine scale processes in the young solar wind, such as switchbacks, which drive and heat the wind; you will also use data from our magnetometer to study the latitudinal dependence of the Sun's magnetic field, which is key to understanding its dynamo and the 11 year solar cycle of activity. It will involve the analysis of multiple data sets from spacecraft, so some programming ability is essential. There will also be the opportunity to undertake complementary theoretical analysis. You will be expected to join the energetic worldwide solar wind science community, and have the opportunity to travel to meetings in Europe and the US.