



**PhD Position at LPC2E (Orléans, France)
Characterization of the electromagnetic waves in the
turbulent solar wind observed by the Solar Orbiter mission.**



Solar Orbiter is the next major solar physics mission of the European Space Agency (ESA). It has been launched in February 2020 to orbit the Sun with 10 experiments on board; 4 of them are dedicated to the in-situ measurement of the surrounding plasma and will operate nominally from the beginning of the mission. Solar Orbiter will be several times at around 0.5 AU from the Sun in 2020 and 2021. The Laboratory of Physics and Chemistry of the Environment and Space (LPC2E), which is the host laboratory for the PhD thesis, is responsible for measuring magnetic field variations via the SCM instrument within the RPW experience.

The solar wind is a permanent and turbulent plasma stream filling the heliosphere and hitting the planets, that has its origin in the solar atmosphere. Understanding its origin and dynamics is one of the top objectives of the Solar Orbiter mission. For this, it is necessary to characterize its properties and how they change with the source region and the distance from the Sun. In particular, different types of plasma waves can play a major role in the evolution and dynamics of the solar wind by exchanging their energy with the particles, as reflected by the evolution of the particles velocity distribution functions with distance from the Sun. Alfvén kinetic waves or Whistler waves are in particular thought to be involved in these energy exchanges, but their precise role is still uncertain. These wave-particles interactions can also be constrained by the statistical analysis of the turbulent magnetic field at kinetic scales, which is still poorly known.

The PhD candidate will work on Solar Orbiter *in situ* observations to help solving these questions. She/He will contribute to the characterization of the turbulent properties of the solar wind and to the identification and characterization of the observed plasma waves, in function of the type of winds and the distance from the Sun. The ultimate goal is to understand the role of electromagnetic waves in the dynamics and heating of the solar wind, which is a long-standing question. The research will be conducted in collaboration with the RPW consortium and other *in-situ* instruments.

We are primarily looking for applicants with a master degree in Physics or Astrophysics. Previous experience in observational data analysis is desirable but not essential. We welcome applications from all members of the community.

The successful candidate will join the LPC2E Space Plasma group, which is also involved in the NASA's Parker Solar Probe mission launched in 2018 and other major space missions (ROSETTA, TARANIS, Bepi Colombo, JUICE). The LPC2E is located in a green area in Orléans and offers pleasant work environment. Orléans is situated about 120km (one hour by train) south from Paris.

Expected start date: 1 October 2020. Selection process starting in January.

Please send your enquiries, CV and a motivation letter to:

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