

SEMINAIRE régulier du Service d'Astrophysique



THE SUN AS A PARTICLE ACCELERATOR: HARD X-RAY, GAMMA-RAY AND RADIO DIAGNOSTICS OF ENERGETIC PARTICLES

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Violent phenomena in the solar atmosphere lead to the production of energetic particles and of bubbles of ionized matter which propagate in the interplanetary medium with speeds of several thousands of kilometres per second. The source of the fast particles and of the mass ejections is well known to be linked to the existence of a complex magnetic field at the surface of the Sun. The rapid changes of the configuration of the intense magnetic fields above sunspots lead to eruptive and flaring phenomena in the solar atmosphere. Solar flares are characterized by a rapid (several minutes to hours) brightening in the active regions surrounding sunspots and also by intense (several order of magnitudes) enhancements of radio and UV/X-ray emissions from the Sun. During flares, the Sun behaves as an efficient particle accelerator. While some high energy particles (electrons and ions) produce high energy radiation in the solar atmosphere (X-rays and gamma-rays), others will escape in the interplanetary medium, propagate along interplanetary magnetic field lines and eventually reach the Earth's orbit.

Particles play a major role in the active Sun since they contain a large amount of the energy released during flares. I shall present here the available information on solar particle acceleration provided by X-ray/ γ -ray observations obtained by the Reuven Ramaty High Energy Solar Spectroscopic Imager (RHESSI) mission. I shall also present some results obtained on electron acceleration and transport in flares provided by the combination of decimetric to kilometric radio observations (from ground-based and space instrumentation) with X-ray spectrally and spatially resolved observations and will discuss how these observations are related to some of the scientific objectives of Solar Orbiter. I will finally present the scientific objectives of the STIX X-ray imager aboard Solar Orbiter.



Un café sera servi 15 minutes avant le séminaire

Ce séminaire aura lieu au CEA Saclay – Orme des Merisiers –bâtiment 709, Salle 003.