

# **Far infrared observations of solar flares during the next solar maximum**

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Observations of the Sun at near-infrared wavelengths brought major advances in our knowledge of magnetic fields in the solar atmosphere, and of magnetic structures in the corona. The infrared spectrum also holds promise for a better understanding of solar flares. However, at present there is a gap of two orders of magnitude between solar flare observations at submillimeter and near-infrared wavelengths. We propose a pioneer experiment, DESIR (Detection of Eruptive Solar Infra Red emission), dedicated to the first ever measurements of solar flares at far infrared wavelengths. There we expect basically two emission processes that provide crucial information on particle acceleration and energy transport in flares : the synchrotron emission of relativistic electrons and positrons and the transient thermal emission of the low chromosphere in response to energy transport from coronal flaring regions. Observing continuum emission in this range with a typical time resolution of a second will bring us the most stringent test of particle acceleration at the Sun, as well as an unprecedented and powerful means to probe the thermal response of low atmospheric layers. The scientific rationale of DESIR will be discussed along with very recent first observations of flares at submillimetre wavelengths, which show us some glimpses of the processes we may deal with in the far infrared range. The DESIR instrument is presently under study. It is part of the payload proposed for the project of a French-Chinese microsatellite, SMESE, which enters phase A studies in June 2006 and which should be launched around the next solar maximum.