

THz photometers for solar flare observations from space

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The concept, fabrication and performance of a double THz photometers system is presented. It is the first detecting system conceived to observe solar flare THz emissions on board of stratospheric balloons. An innovative optical setup allows observation the full solar disk and the detection of small burst transients at the same time. The system, named SOLAR-T, has been fabricated, integrated to data acquisition and telemetry modules for this application. The tests included the whole system performance, on ambient and low pressure and temperature conditions. One artificial Sun setup was developed to simulate actual observations and testing sensitivities. SOLAR-T uses two Golay cell detectors preceded by low-pass filters made of rough surface primary mirrors and membranes, 3 and 7 THz band-pass filters, and choppers. SOLAR-T photometers can detect small solar bursts (tens of solar flux units) with sub second time resolution. It is intended to provide data on the still unrevealed spectral shape of the mysterious THz solar flares emissions. The experiment is planned to fly on board of two long-duration stratospheric balloon flights over Antarctica and Russia in 2014-2016.