

UCIRC2: EUSO-SPB2's Infrared Cloud Monitor

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The second generation of the Extreme Universe Space Observatory on a Super Pressure Balloon (EUSO-SPB2) is a balloon instrument for the detection of ultra high energy cosmic rays (UHE-CRs) with energies above 1 EeV and very high energy neutrinos with energies above 10 PeV. EUSO-SPB2 consists of two telescopes: a fluorescence telescope pointed downward for the detection of UHECRs and a Cherenkov telescope pointed towards the limb for the detection of tau lepton-induced showers produced by up-going tau neutrinos and background signals below the limb. Clouds inside the field of view of these telescopes reduce EUSO-SPB2's geometric aperture, in particular that of the fluorescence telescope. For this reason, cloud coverage and cloud-top altitude within the field of view of the fluorescence telescope must be monitored throughout data-taking. The University of Chicago Infrared Camera (UCIRC2) will monitor these clouds using two infrared cameras centered at 10 and 12 microns. By capturing images at wavelengths spanning the cloud thermal emission peak, UCIRC2 will measure cloud color-temperatures and thus cloud-top altitudes. A prototype of UCIRC2 has been constructed and is undergoing calibration. The final version of UCIRC will be constructed and calibrated well before launch of EUSO-SPB2, expected in 2023.

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