

과학위성 1호의 고에너지 입자 검출기 개발 Solid-State Telescope on KAISTSAT-4

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Solid State Telescope(SST), one of the four space plasma instruments being developed for KAISTSAT-4(K-4), is designed specifically to measure the energetic electrons with energies from 25KeV to 1MeV. With three other plasma instruments, Electro-static Analyzer(ESA), Langmuir Probe(LP),and Scientific Magnetometer(SM), SST will allow in-situ detection of penetrating auroral electrons in the polar region and thus, the study of microscale physics with high time resolution data of the earth's polar region that has not been previously achieved with other space missions. SST consists of two telescopes, each of which is looking in the direction parallel and perpendicular to the earth's magnetic field, respectively. The energy of the incident particles is determined from the energy transferred to surface-barrier silicon detectors(SSDs) and the coincidence/anti-coincidence logic of the two neighboring detectors. The geometrical factor of SST is $0.03(\text{cm}^2 \cdot \text{sr})$, determined in view of the maximum electron flux in the polar region to be $5 \times 10^6(1/\text{cm}^2 \cdot \text{sr} \cdot \text{s})$ and the dead time of the circuits to be $6\mu\text{s}$. The field of view of the telescope is 36.3° . The proposed resolution of 50ms for SST is expected to adequately resolve the sub kilometric-scale structures associated with the formation of Earth Aurora over the Polar region.