

The Development of the High Energy Particle Detector Onboard the SELENE Spacecraft

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The PS (Particle Spectroscopy) sensor, that will be onboard the SELENE spacecraft for the first Japanese lunar mission to be launched in 2005, will measure the high energy cosmic ray particles to measure a radiation environment around the moon for human activities in the future and to study their acceleration and propagation in the solar system. The PS sensor consists of 4 detectors: High energy Isotope Detector (HID), Low energy Particle Detector for Heavy ions (LPD-HE), Low energy Particle Detector for proton (LPD-p) and Low energy Particle Detector for electron (LPD-e). These are Si stuck detectors using the β E x E method that are cover the energy range from 100keV to 60MeV for proton, from 30keV to a few MeV for electron and from 3MeV/n to 400MeV/n for heavy ions, respectively. We use a new type B+ doped Si(Li) detector of which thickness is from 1 to 6mm with high energy resolution for each sensor. We can identify the isotopes for heavy ions from He to Xe by the PS sensor. We have developed newly boron doped Si lithium detectors for SELENE mission to observe charged particles in the wide energy range. The PS flight models have finished testing and calibrating by accelerated Kr beams and fragment beams in HIMAC in Japan. The resolution of position on the new PSD is less than 200mm. It is enough to calculate the incident angle of incident particles. The resolution of particle identification was shown that the nuclear charge resolution of the CPS HID instrument is less than 0.48(FWHM). It is enough to identify ultra heavy ions in cosmic rays.