

Progress in the development of large-area, ultra-thin silicon detectors for space-based applications.

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Silicon solid-state detectors have been used in the past to measure the energy deposit dE/dx and total energy E of solar and galactic energetic particles in order to derive their mass and charge and hence to study composition of particle populations in space. The lower energy limit of the measurement is set by the total energy loss of the particle in the dE/dx detector. In order to sample the range of kinetic energies per nucleon down to about 1MeV, of interest for solar particle studies, the dE/dx detector thickness cannot exceed 10-20 μ . Very thin silicon membranes, however, are quite fragile and have thus been limited in their practical sizes to less than a few square cm, which reduces their applicability in the study of less abundant species. This paper presents some of the progress in the current JPL/Caltech efforts to produce large area (tens to a hundred square cm) monolithic silicon devices with thicknesses in the 10...20 μ range.