[S3-3] CREAM: Cosmic Ray Balloon Mission in Antarctica

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The Cosmic Ray Energetics And Mass (CREAM) instrument is configured with stateof-the-art particle detectors to measure cosmic ray composition from protons to iron nuclei over the energy range 1 - 103TeV in a series of balloon flights. The goal is to observe cosmic-ray spectral features and/or abundance changes that might signify a limit to supernova acceleration. The science instrument will be integrated with a flight support system developed for 100-day flights. Particle charge (Z) measurements will be made with a timing-based detector and a pixelated silicon matrix to minimize the effect of backscatter from the calorimeter. Particle energy measurements will be
made with a transition radiation detector for Z >3 and a sampling Tungsten/scintillator calorimeter for Z 1. In-flight cross calibration of the two detectors allows better determination of the particle energy. Measurements of relative abundances of secondary cosmic rays (e.g., B/C) as well as primary spectra will allow determination of cosmic ray source spectra at this high energy, where measurements are currently not available. The instrument has been tested and calibrated with a series of beam tests at CERN. The first flight is planned to be launched from Antarctica in December 2004 on a zero pressure balloon. Using two instrument suites, we plan to conduct annual flights on a zero pressure balloon until ultra long duration balloons become available. The status of the instrument suites and the flight plans will be reported.

[S3-4] Design of MEMS Micromirror for Low Temperature Infrared Telescope

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A low temperature applicable MEMS micromirror array is being designed for a future infrared telescope in space. The required cryogenic operation temperature is lower than 30K and a unit mirror size is 100um x 100um for a pixel sampling of 0.25 arcsec for 3.5m telescope. It will function as focal plane object selection devices. we are planning to fabricate it on silicon substrate with MEMS technology.

We will introduce the conceptual design of micromirror and the process flow for this application.