



Energetic Particle Instrumentation for Future Space Physics Missions

C.H. Perry, D.K. Griffin, M.W. Dunlop, J.A. Davies, and M.A. Hapgood

Rutherford Appleton Lab., Space Science and Technology Dept., Oxfordshire, United Kingdom (c.h.perry@rl.ac.uk)

Collisionless plasmas frequently exhibit strong fluxes of electrons and ions at energies well above the mean plasma energy. These suprathermal particles play an important role in the identification and interpretation of the fundamental properties and physical processes within space plasmas. Investigations of these energetic populations require both good angular and temporal resolution measurements. Large geometric factors and fast electronics are vital to ensure adequate sampling of the tail of the particle distribution.

We present the status of the energetic particle instrument development activity that is currently underway at the Rutherford Appleton Laboratory. This is in preparation for both the proposed HEP instrument for Cross-Scale mission, which is currently undergoing assessment for the ESA's Cosmic Vision programme, and the IEPS instrument for the Chinese KuaFu mission. The activities are based on the heritage of instruments already successfully flown on the NASA/Polar and ESA/Cluster spacecraft. The design consists of a simple 'pin-hole' aperture and segmented silicon solid state detector array capable of measuring energetic particle distributions in the range 30-1000 keV. Key features of the activities include the development of 1) a modular mechanical design that can easily support different spacecraft accommodation constraints and scientific requirements, 2) combined detector configurations for ions and electrons, and 3) multi-channel hybrid ASICs for the sensor electronics which is crucial for low mass and power.