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The Energetic Particle Monitor on board EQUARS Satellite

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The Energetic Particle Monitor (EPM) is one of the scientific Instruments onboard the Brazilian Equatorial Atmosphere Research Satellite - EQUARS, scheduled to be launched in 2005-2006, orbiting equatorial region at 700-800 km with an inclination of 20 degrees. The EPM will measure the high-energy charged particle flux that precipitates in the equatorial upper atmosphere and near South Atlantic Geomagnetic Anomaly. Both proton and heavier ions ($Z>2$) with energy in the range 0.6-50 MeV will be measured. The objective of the EPM is to investigate the proton and heavy particle flux variability in South Atlantic Geomagnetic Anomaly during magnetic storms and study/monitor the influence of high energetic particles on its equipments and their onboard systems. A laboratorial version of the high energy particle detector was designed and is full operational at the Nuclear Physics Department of the Sao Paulo University (USP). This detector has been used to study high energy process using a linear accelerator. The development of the instrument for spatial applications is based on the previous one. In order to operate in the space environment and within the satellite constraints, a new design has been developed along with a new electronic implementation. This will require several tests resulting in many prototypes. Based on the previous discussions the characteristics of the EPM will be described in this work. High particle energy detection techniques will also be discussed, along with the proposed electric diagrams and the simulation projects.

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