Contribution ID: **51** Type: **Poster**

Background for High Energy Space Instrumentation at ISS

Wednesday 27 September 2006 16:20 (25 minutes)

The aim of this paper is to present the preliminary background modelling results of the Miniature X-and Gamma-ray Sensor (MXGS) instrument in the Atmospheric-Space Interaction Monitor (ASIM). ASIM is an atmosphere event observatory with a wide energy range (from optical to gamma-ray) foreseen to be located at the external facility of the Columbus Module at the ISS in 2009.

The model takes into account the most important background sources: cosmic protons and trapped particles in the Earth Geomagnetic Field.

The preliminary results shown that MXGS will be able to distinguish between RHESSI TGF's for at least 75% of observing time.

Summary

The MXGS instrument is a spectrometer based on a 576 cm2 CdZnTe (5 mm thickness) pixellated detector plane optimized for the energy range from 10 up to 500 keV. The MXGS main scientific objective consists on the study of the Earth atmosphere gamma ray burst, so called Terrestrial Gamma-ray Flashes (TGF) (Nemiroff et al.,1997).

The TGF expected to be observed at the ISS is 5 ms. Burst with a fluence of ph/cm2/msec/keV similar to those derived from the analysis of RHESSI data. Therefore, the MXGS sensitivity will be determined by the environment background at the ISS orbit.

The ISS environment has been simulated using the SPENVIS (ESA) and the CREME96 (NRL) tools. Decay products have been simulated using the Geant4 toolkit.

The cosmic proton flux has been simulated using CREME96 assuming a solar quiet model (absence of flares) during a solar minimum period. The integrated flux (orbit average) for the cosmic protons source in the detector is 0.14 counts/cm2/sec.

Trapped particles have been simulated using SPENVIS having as inputs the AP8-MIN and AE8-MIN trapped particle models. The main conclusion is that MXGS will be under a very high flux of trapped particles 20% of orbital time.

Protons dominates background spectra with an expected count rate from 3000 counts for deeper South Atlantic Anomaly (SAA) crossing to 8-5 counts for marginal SAA passes. The remaining components of background, like electrons and photons, are responsible of less than 20% of the expected count rate.

Finally, these preliminary results have been obtained in the ASIM mission Phase A. The current objective, to be performed during mission Phase B) is to identify the decay products from the inputs simulated in GEANT4 and to perform a detailed MXGS background model.

Primary author: RUSSU, Andres (Astronomy and Space Science Group - ICMUV - University of Valencia)

Co-authors: Mr SANCHIS, Javier (Astronomy and Space Science Group - ICMUV - University of Valencia); Ms RODRIGO, Juana Maria (Astronomy and Space Science Group - ICMUV - University of Valencia); Mr CONNELL, Paul (Astronomy and Space Science Group - ICMUV - University of Valencia); Mr BLAY, Pere (Astronomy and Space Science Group - ICMUV - University of Valencia); Mr REGLERO, Victor (Astronomy and Space Science Group - ICMUV - University of Valencia)

Presenter: RUSSU, Andres (Astronomy and Space Science Group - ICMUV - University of Valencia)

Session Classification: Poster sessions