



SÉMINAIRE DE PHYSIQUE CORPUSCULAIRE

SUJET: Atmospheric Neutrons - A Background Study for the X-ray Polarimeter PoGOLite

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RÉSUMÉ:

Polarimetry remains a relatively unexplored field of X- and gamma-ray astrophysics. The lack of polarimetric measurements in this energy range is partly a result of the typically low signal detection efficiencies of the detectors. A second reason, especially relevant for balloon-borne detectors, is the high radiation environment in which the measurements have to be performed. PoGOLite is a balloon-borne hard X-ray polarimeter which performed its first scientific, near circumpolar flight, during the summer of 2013. It is designed to measure the polarisation of X-rays coming from astrophysical point sources, such as the Crab nebula, using a segmented plastic scintillator array. To reduce the measurement background PoGOLite employs several dedicated background rejection systems. The background encountered during flight, which is mostly a result of fast neutrons scattering in the plastic scintillator array, remains however, significant. A detailed understanding of the background is therefore required, including an understanding of the variation of the background rate during the flight, and the ability of such a backgrounds to induce a fake polarisation signal. For this purpose, detailed Monte Carlo studies of the PoGOLite instrument were performed. The high altitude atmospheric neutron environment, responsible for the majority of the PoGOLite background, was furthermore studied using a dedicated balloon-borne detector called PoGOLino. This instrument uses a novel scintillator based technique to measure the neutron flux. PoGOLino was launched from the Esrange Space Centre in Northern Sweden in March 2013. The measurement results of this detector will be discussed, together with a new model describing the atmospheric neutron flux which was developed by members of the PoGOLite collaboration. Finally the results of the PoGOLite flight of 2013 will be discussed and compared to predictions made using the performed background study.

INFORMATION : <http://dpnc.unige.ch/seminaire/annonce.html>

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