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(G*) Hodoscope Development for the High Energy Light Isotope eXperiment (HELIX)

Tuesday 28 May 2024 14:45 (15 minutes)

The High Energy Light Isotope eXperiment (HELIX) is a balloon-borne payload designed to measure the isotopic abundances of light cosmic ray nuclei. Precise measurements of the ¹⁰Be isotope from 0.2 GeV/n to beyond 10 GeV/n will allow the refining of cosmic ray propagation models, critical for interpreting excesses and unexpected fluxes reported by several space-borne instruments in recent years. Beryllium isotopes will be observed by HELIX with the first in a series of long duration balloon flights this summer in the Arctic. Upon completion of its maiden voyage, the detectors that make up the payload will be upgraded for a second flight to enhance performance and increase statistics. Potential upgrades for the HELIX hodoscope, an instrument contributing to the observation of particle path in the experiment, are being developed for this purpose.

The hodoscope is a position-measuring detector that uses ribbons of scintillating fibres woven into silicon photomultipliers to provide the location of incident particles in a high resolution. A prototype for an updated optical sensor readout system is being constructed at Queen's University without fibre weaving. In this presentation, I will discuss the design and development status of the prototype hodoscope for the future HELIX payloads.

Keyword-1

SiPM

Keyword-2

Hodoscope

Keyword-3

Balloon

Author: BAIOCCHI, Melissa

Presenter: BAIOCCHI, Melissa

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