

Canadian Association of Physicists

Association canadienne des physiciens et physiciens

Contribution ID: 16 (Étudiant(e) du 1er cycle) Type: Poster Competition (Undergraduate Student) / Compétition affiches

(POS-46) Measuring Temperature dependent Drift Times for the HELIX experiment

Tuesday 10 June 2025 18:02 (2 minutes)

HELIX (High Energy Light Isotope eXperiment) is a ballon experiment designed to measure abundance of cosmic ray isotopes from hydrogen to neon, with a particular interest in abundances of beryllium isotopes. HELIX aims to provide essential data to study the cosmic ray propagation in our galaxy. The Drift Chamber Tracker (DCT) in HELIX is a multi-wire gas drift chamber designed to measure the position of incident cosmic rays. It is located inside a magnet, bending the trajectory of incoming particles through 72-layers of tracking, enabling the measurement of the momentum of incoming particles.

Before the data can be used for scientific analysis the instrument must be well calibrated. In order to calibrate the DCT data it was necessary to determine the maximum drift velocity of each wire over a short period of time. To do this I developed an algorithm to be able to identify the maximum drift velocity for each wire over each dataset. This revealed a position dependence of the data within the detector. I preformed a study on the temperature dependence of the drift velocities analyzing data from different time periods over the course of the flight, to characterize this dependence I also built a predicted heat map of the gas within the detector over the course of the flight. This involved calibrating the thermistors based on data collected when the experiment was on the ground. This helped confirm that the predicted temperature was reasonable and that the variation was temperature dependent. This algorithms and this study can now be applied to the full data set to develop a calibration method.

Keyword-1

Cosmic ray

Keyword-2

Balloon expirement

Keyword-3

Author: BARSKY-GILES, Gabrielle

Presenter: BARSKY-GILES, Gabrielle

Session Classification: PPD Poster Session & Student Poster Competition | Session d'affiches PPD et concours d'affiches étudiantes (7)

Track Classification: Technical Sessions / Sessions techniques: Particle Physics / Physique des particules (PPD)