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Isotopic composition of cosmic rays with the HELIX balloon project

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Clock isotopes such as beryllium-10 provide a unique Galactic cosmic ray lifetime measurement related to the size of the propagation halo in the Milky Way. There have yet to be high-precision measurements of beryllium-10 above 2 GeV/n. The High Energy Light Isotope eXperiment (HELIX), a balloon-borne magnet spectrometer, directly measures a cosmic ray's charge, magnetic rigidity, and velocity to identify the isotopes of beryllium and other light nuclei. The HELIX program will improve the statistics and extend the resolved measurements of beryllium isotopes to as high as 10 GeV/n. The magnetic rigidity is measured with a high-precision drift chamber tracker in a 1 Tesla magnetic field generated by a pair of superconducting coils. Time-of-flight scintillator paddles are used for charge measurements and velocity at lower energies, whereas at higher energies velocity is measured with an aerogel-based ring-imaging Cherenkov detector. During the boreal spring of 2024, HELIX had an engineering flight from ESRANGE, Sweden. This contribution presents an overview of the payload, flight, and the status of ongoing analysis efforts.

Collaboration(s)

HELIX

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