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Calibration of the Aerogel radiator tiles for the RICH of the HELIX Experiment

HELIX (High Energy Light Isotope eXperiment) is a balloon-borne instrument designed to measure the chemical and isotopic abundances of light cosmic-ray nuclei. In particular, HELIX is optimized to measure ^{10}Be and ^{9}Be in the range 0.2 GeV/n to beyond 3 GeV/n. To measure the energy of nuclei beyond about 1 GeV/n, HELIX utilizes a ring-imaging Cherenkov (RICH) detector. The RICH detector consists of aerogel tile radiators (refractive index ˜1.15-1.16) and a silicon photomultiplier detector plane. To adequately discriminate between ^{10}Be and ^{9}Be isotopes, the refractive index of the aerogel tiles must be known to a precision of 0.1%. In this contribution we describe the measurement of the refractive index, and its lateral position dependence, for the aerogel tiles using a 35 MeV electron beam and an array of inexpensive one-dimensional CCD sensors.

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