

## Improved $^3\text{He}/^4\text{He}$ isotope separation in EPHIN data based on simulations

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In order to improve the separation of helium isotopes  $^3\text{He}$  and  $^4\text{He}$  measured by the Electron Proton Helium Instrument (EPHIN) aboard the Solar and Heliospheric Observatory (SOHO), we used Monte Carlo simulations to understand the instrument's response to incoming particles. The identification of different isotopes is based on the  $dE/dx$ -E-method. For an ideal telescope with the energy loss  $\Delta E$  much smaller than the energy  $E$ :  $\Delta E * E \propto Z^2 * m * \Delta x$ . Herein  $Z$ ,  $m$  are the charge and mass of the particle and  $\Delta x$  the path length in the detector. In order to separate isotopes from each other, it is mandatory to know  $\Delta x$  with a high precision and to correct for a non-ideal telescope. Our simulations allow to determine the above mentioned effects and have been used to develop a correction method and thus improve the resolution significantly. Furthermore, we examine the ratio of the aforementioned isotopes during solar events and in the cosmic background using this new method.

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