A Data-Driven approach for the measurement of $^{10}Be/^{9}Be$ flux ratio in Cosmic Rays with magnetic spectrometers.

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Cosmic rays are a powerful tool for the investigation of the structure of the magnetic fields in the Galactic halo and the properties of the inter-stellar medium.
Two parameters of the cosmic ray propagation models, the Galactic halo (half) thickness, H , and the diffusion coefficient, D , are loosely constrained by current cosmic ray flux measurements; in particular, a large degeneracy exists, with only H/D being well measured.
The $^{10}Be/^{9}Be$ isotopic flux ratio (thanks to the 2 My lifetime of ^{10}Be) can be used as a radioactive clock providing the measurement of cosmic ray residence time in a galaxy. This is an important probe with which to solve the H/D degeneracy. Past measurements of $^{10}Be/^{9}Be$ isotopic flux ratios in cosmic rays are scarce, and were limited to low energy and affected by large uncertainties. Here a new technique to measure $^{10}Be/^{9}Be$ isotopic flux ratio, with a data-driven approach in magnetic spectrometers is presented. As an example, by applying the method to beryllium events published via PAMELA experiment, it is now possible to determine the important $^{10}Be/^{9}Be$ measurement while avoiding the prohibitive uncertainties coming from Monte Carlo simulations. It is shown how the accuracy of PAMELA data strengthens the experimental indication for the relativistic time dilation of ^{10}Be decay in cosmic rays; this should improve the knowledge of the H parameter.