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Cosmic Ray Nuclei in the Galaxy and their secondary products: a new comprehensive model.

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We model the transport of cosmic ray (CR) nuclei in the Galaxy by means of a new numerical code which allows to account for a generic spatial distribution of the diffusion coefficient. We found that in the case of uniform diffusion, the main secondary/primary nuclei ratios and the modulated antiproton spectrum match consistently the available observations. We include in our analysis the recently released CREAM measurements and the preliminary PAMELA antiproton/proton data.
We generalise these results accounting for a radial dependence of the diffusion coefficient, which is assumed to trace that of supernova remnants. While this does not affect our successful predictions for the secondary nuclei and antiproton spectra, the simulated CR radial distribution and the gamma-ray diffuse emission longitude profile can be significantly different from the uniform case. We will discuss how this may play a role solving both the cosmic ray gradient and anisotropy problems.

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