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The FLUKA cross sections for cosmic-ray propagation studies

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While the accuracy of current cosmic-ray (CR) data allows us to carry out precise tests of our models of propagation of charged particles in the Galaxy, the precision of cross sections data for the production of secondary particles (secondary CRs, neutrinos, gamma rays) is very poor, considerably limiting these tests. Given that most of the calculations of these cross sections from fundamental models of particle interactions are in disagreement with data, we rely on parameterizations fitted to the very scarce and uncertain experimental data.

In the last years, the FLUKA Monte Carlo nuclear toolkit has been optimized to be used in different kinds of CR studies and has been extensively tested against data. In this talk, we present new sets of spallation cross sections of CR interactions in the Galaxy, both inelastic and inclusive, computed with FLUKA. Furthermore, these cross sections have been implemented in the DRAGON2 code to characterize the spectra of CR nuclei up to $Z=26$ (Iron) and study the main propagation parameters predicted from the spectra of secondary CRs such as B, Be and Li. These results and their implications will be discussed in the talk.

Collaboration name

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