

Impact of cross sections uncertainties on GCR propagation studies

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What is this contribution about?

This contribution treats the impact of spallation cross sections uncertainties in the studies of galactic cosmic-ray propagation. Here, we review a compilation of studies carried out to investigate the predictions on the production of secondary cosmic rays considering cross sections uncertainties.

Why is it relevant / interesting?

Understanding the production of secondary cosmic rays is crucial to improve our models of cosmic-ray propagation in the Galaxy. Therefore, it is important to show how cross sections uncertainties can affect our current propagation models and how we can prevent biasing our results.

What have we done?

We evaluate the uncertainties associated to cross sections measurements and look for hints of production of B, Be, Li and F at astrophysical sources. We also show how these uncertainties significantly limit our ability to make constraints on the galactic halo height. Finally, we analyse the ratios of B, Be and Li and combine them in an analysis which also adds nuisance parameters to rescale the cross sections parametrizations, for both the GALPROP and DRAGON2 cross sections.

What is the result?

We show that there is no hint of production of B, Be, Li and F from astrophysical sources when considering the uncertainties associated to spallation cross sections. We also show how different cross sections parametrizations lead to different propagation parameters to explain AMS-02 data and demonstrate that the DRAGON2 parametrizations allow us to reproduce all the ratios of secondary cosmic rays simultaneously.