

A New Map of Neutrino Emission in Our Galaxy with CRPropa

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In the next ten years, neutrino telescopes will become increasingly sensitive to galactic neutrinos, the flux of neutrinos produced by astrophysical sources and in cosmic ray interactions within our galaxy. This new flux offers a promising laboratory for exploring beyond the standard model neutrino physics dependent on ultra-long baselines. However, searches for these BSM signals will require improved understanding of the galactic neutrino distribution, since the signal will depend on the spread of neutrino production at different distances along a given galactic line of sight. This additional dimension has not been used in galactic neutrino searches and has not been modeled. We use the cosmic ray propagation software CRPropa to produce a four-dimensional spatial and energy neutrino distribution by simulating the collisions between galactic cosmic rays and gas. We vary the input gas maps, cosmic ray source distributions and spectra, magnetic field properties, and interaction cross-sections and calculate their effect on the resulting neutrino distribution. We also compare our four-dimensional distributions to existing galactic neutrino maps. By understanding where neutrinos are produced within our galaxy, we hope to enable new tests of neutrino properties and interactions.

Poster prize

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