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Expectations for high energy diffuse galactic neutrinos for different cosmic ray distributions

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The interaction of cosmic rays with the gas contained in our Galaxy is a guaranteed source of diffuse high energy neutrinos. We provide expectations for this component by considering different assumptions for the cosmic ray distribution in the Galaxy which are intended to cover the large uncertainty in cosmic ray propagation models. We calculate the angular dependence of the diffuse galactic neutrino flux and the corresponding rate of High Energy Starting Events in IceCube by including the effect of detector angular resolution. Moreover we discuss the possibility to discriminate the galactic component from an isotropic astrophysical flux. We show that a statistically significant excess of events from the galactic plane in present IceCube data would disfavour models in which the cosmic ray density is uniform, thus bringing relevant information on the cosmic ray radial distribution. We finally consider the constraints on the high energy galactic neutrino flux arising from gamma observations at TeV energies.

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