

High-Energy Neutrinos from Fast-spinning Newborn Pulsars

Thursday, 29 October 2015 18:10 (15 minutes)

Fast-spinning newborn pulsars are promising sources of ultrahigh energy cosmic rays (UHECRs). With proper injection abundances, integrated cosmic rays from the extragalactic pulsar population can match UHE observation in all aspects - energy spectrum, chemical composition, and anisotropy. High-energy neutrinos would be produced unavoidably, when accelerated UHECRs travel through the supernova envelope surrounding the pulsar. In this talk, we will investigate this neutrino production process, including the hadronuclear interaction between cosmic rays and the background, and possible suppression due to the pion interaction. We will report the spectrum, flux and flavor ratio of the high-energy neutrinos from pulsars, and compare their detectability to sensitivities of current and future experiments. Finally, we will discuss our model dependence on the source emissivity, the distribution of pulsar population at birth, as well as the injection composition of cosmic rays.

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Session Classification: Neutrinos

Track Classification: Neutrino physics