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High energy neutrino astronomy - the neutrino connections to cosmic ray origin: Present and Future

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High energy neutrino astronomy has been blooming. In addition to the possible identification of the blazar and Seyfert II galaxies as neutrino emitters, the present data has indicated some hints to characterize or constrain the cosmic ray origin. In this talk we demonstrate how the neutrino data has constrained the cosmic ray origin. The two observational facts that the astrophysical neutrino background flux is comparable to that of UHE cosmic rays and that blazar galaxies are not the major class of neutrino sources suggest our next move in the neutrino measurements in TeV and PeV sky to understand the cosmic ray origin. We also review the technical developments for the future neutrino detectors beyond the present IceCube observatory, with some focus on optical sensors for Cherenkov detection.

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