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Constraining Neutrino Self-Interactions Using IceCube Data from Multiple Sources

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The scenario of neutrino self-interactions is an interesting beyond-Standard Model possibility that is difficult to test. High energy neutrinos measured by the IceCube neutrino detector having traveled long distances present an opportunity to attempt to constrain the parameters governing neutrino self-interaction: the mediator mass and coupling constant. We have modeled neutrino production, propagation, and detection by IceCube to predict the detected flux of neutrinos with neutrino self-interactions at a given value of the coupling constant and mediator mass. Using this model we can perform a joint analysis of several neutrino sources (the TXS 0506+056 blazar and the NGC 1068 AGN) whose different inherent assumptions make the joint analysis beneficial. Prior works have only examined sources individually, so our study of data points taken from multiple sources provides a statistically novel approach to this problem. We present our ongoing work on this analysis.

Mini Symposia (Invited Talks Only)

Primary authors: HANNING, Sabrina; Dr HYDE, Jeffrey (Swarthmore College)

Presenter: HANNING, Sabrina

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