MICHIGAN STATE UNIVERSITY
Department of Statistics and Probability

COLLOQUIUM

Tyce DeYoung
Michigan State University

Spectral Measurement and Source Detection in Neutrino Astronomy

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10:20 AM - 11:10 AM
Refreshments 10:00 AM
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Abstract

The IceCube Neutrino Observatory, commissioned in 2010, uses a billion tons of Antarctic ice below the South Pole to detect high energy neutrinos produced by extreme astrophysical systems. A quasi-diffuse flux of astrophysical neutrinos was discovered by IceCube in 2013, and the first individual neutrino source, a supermassive black hole accreting matter from its host galaxy, was identified in 2017. Neutrinos offer a unique probe of particle dynamics in these astrophysical systems, but the low signal to noise ratio and unique properties of neutrinos present statistical challenges. Improved characterization of the energy spectrum of the diffuse flux may shed light on the population(s) of sources emitting the neutrinos. Methods for detecting spatially extended neutrino sources of unknown morphology would help determine the contribution of Galactic sources to the overall flux. The IceCube data set and current methods of data analysis will be discussed.

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