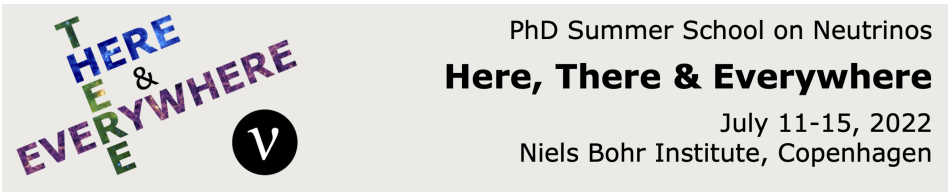

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Deciphering Cosmic Neutrinos

Monday 11 July 2022 14:00 (12 minutes)

High-energy neutrino astronomy is rapidly evolving: After the discovery of a largely diffuse astrophysical TeV-PeV neutrino flux, the IceCube Neutrino Observatory has more recently found indications of associations between blazar emission and high-energy neutrinos. However, different analyses show that blazars are only expected to make up a subdominant contribution to the total observed diffuse flux. We are thus in the remarkable situation that we have firmly detected a diffuse astrophysical neutrino flux but at the same time, we have so far no (well-established) neutrino point sources. Neutrinos are produced along with γ-rays in the interactions of Ultra High-Energy Cosmic Rays (UHECRs) and radiation and gas. But as with UHECRs, the sources of the high-energy neutrinos are as yet unknown. The close relations between the emission of the different messengers: cosmic rays, neutrinos and gamma-rays make it possible to study the neutrino flux with a multi-messenger approach. Our work investigates the viable source populations responsible for the high-energy largely diffuse neutrino flux that IceCube has observed. Using multi-messenger data, we seek to derive a set of necessary conditions on neutrino source candidates. Once we have the resulting candidate neutrino source populations, the aim is to test them in an IceCube data analysis.

Author: GROTH, Kathrine Mørch (Niels Bohr Institute, University of Copenhagen)

Presenter: GROTH, Kathrine Mørch (Niels Bohr Institute, University of Copenhagen)

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