
Contribution ID: **161** Type: **Oral Presentation**

# Probing Dark Matter Signatures in IceCube Astrophysical Neutrino Data

*Wednesday 9 July 2025 15:20 (20 minutes)*

Dark Matter (DM) makes up a significant portion of the universe's mass-energy content, yet its fundamental nature remains elusive. Neutrinos are nearly massless particles that interact weakly with ordinary matter and may provide evidence of subtle interactions with DM. One possibility is that dense DM spikes, which form around supermassive black holes, can weaken the high-energy neutrino flux emitted from the host galaxy. Therefore, observing high-energy neutrinos from active galactic nuclei (AGN) can offer a unique opportunity to investigate these interactions. Recent observations of point-like neutrino sources, such as the blazar TXS 0506+056 and the radio galaxy NGC 1068 by the IceCube observatory, present a valuable chance to explore DM interactions beyond standard astrophysical scenarios. In this context, we aim to constrain the neutrino-DM scattering cross-section by combining data from all these sources, leveraging the public information provided by IceCube.

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**Session Classification:** Astrophysics & Space Science

**Track Classification:** Track D1 - Astrophysics