## Phenomenology 2025 Symposium



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## Sensitivity of the IceCube Neutrino Observatory to Primordial Black Hole Evaporation

Primordial black holes remain compelling candidates for dark matter and could produce detectable highenergy neutrino fluxes through Hawking radiation. We extend beyond previous analytical frameworks by implementing a comprehensive examination of various black hole mass distribution models and their corresponding neutrino emission characteristics. Through detailed simulations of detector response, we derive projected exclusion contours in both the mass-abundance ( $M - f_{\rm PBH}$ ) parameter space using IceCube and project future discovery potential for the IceCube-Gen2 configuration. Additionally, we map these constraints onto the neutrino flavor triangle, providing insight into how flavor composition measurements can further constrain PBH properties. Our multi-dimensional approach demonstrates improved constraints compared to previous analyses, potentially advancing our understanding of these primordial relics and their neutrino signatures.

## Mini Symposia (Invited Talks Only)

Plenary (Invited talks only)

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