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## **HNL Searches in IceCube: Current Status and Future Opportunities**

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Heavy Neutral Leptons (HNLs) are GeV-scale right-handed (sterile) neutrinos which have been posited as a possible explanation for light neutrino masses via the seesaw mechanism. HNL production from tau neutrinos and the HNL's subsequent decay would produce a unique double-bang signature in the IceCube detector, enabling a novel search for GeV-scale HNLs at atmospheric neutrino energies. Currently, event reconstruction of these double-bangs is adapted from the astrophysical tau neutrino reconstruction, and does not address the difficulty of reconstructing low-light events more common at these lower energies. The HNL signal in IceCube is therefore currently limited to an excess of cascade-like events, rather than a clear double-bang signal. In this talk, I address the opportunities and challenges of searching for this double-bang signal, and suggest how updated reconstruction and event selection techniques, along with the IceCube upgrade, enhance future opportunities for HNL searches.

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