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## **Simulating and searching for Heavy Neutral Leptons in IceCube**

*Thursday 31 August 2023 17:00 (15 minutes)*

Heavy Neutral Leptons (HNLs) are sterile neutrinos posited as an explanation for light neutrino masses. IceCube is uniquely capable of searching for an HNL in the hundreds of MeV to single GeV range by looking for atmospheric tau neutrinos upscattering to HNLs in the detector. The HNLs produced in IceCube would decay quickly, leading to Cherenkov radiation in both production and decay separated by a few meters, producing a “double cascade” signature in the detector. A simulation based on the most up-to-date calculations of HNL decay modes and cross-sections is required to understand the hundreds of MeV to single GeV parameter space for an HNL search. This talk outlines the capabilities of the first HNL simulation for neutrino observatories, and presents sensitivities for IceCube’s HNL search.

### **Submitted on behalf of a Collaboration?**

Yes

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