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## Probing the MeV Frontier with IceCube: Supernovae, Transients, and Future Directions

*Monday, September 15, 2025 3:20 PM (20 minutes)*

The IceCube Neutrino Observatory, though primarily designed for high-energy neutrinos, has become a powerful tool for studying MeV-scale neutrino bursts from astrophysical transients. This talk will provide an overview of recent efforts and developments aimed at enhancing IceCube's capabilities in this energy regime, including searches for core-collapse supernovae, gamma-ray bursts, and compact object mergers. Key improvements in the real-time supernova data acquisition system will be highlighted, alongside ongoing efforts to probe new physics scenarios, such as axion-like particles produced in supernovae. The talk will conclude with a look ahead to the deployment of the IceCube Upgrade and the potential of IceCube-Gen2 to expand MeV-scale neutrino science, including efforts toward energy reconstruction from supernova neutrinos.

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