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Neutrino Physics: On Earth and in the Heavens

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The discovery 15 years ago that neutrinos have mass and can spontaneously change their flavors has led to intense activity in nuclear and particle physics, including plans for powerful neutrino beams for long-baseline oscillation experiments and for ton-scale ultraclean underground detectors for double beta decay studies. Our improved knowledge of neutrinos has also enabled us to understand better their roles in astrophysics. Supernova neutrinos may be responsible for important nucleosynthesis in the first stars that formed in our galaxy, and solar neutrinos may allow us to determine the metallicity of the primordial gas cloud from which our solar system formed. I will review some of these themes and their connections, arguing that recent neutrino discoveries are just the beginning of a series of surprises.

Author: Prof. HAXTON, Wick (University of Washington / University of California)

Presenter: Prof. HAXTON, Wick (University of Washington / University of California)

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