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Neutrinoless Double Beta Decay: a Window on the Origin of Neutrino Mass

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The discovery of neutrino oscillations has had a profound effect on our understanding of fundamental physics. Oscillation data have proven the existence of finite neutrino mass, and resolved three decades of experimental anomalies in solar and atmospheric neutrino measurements. On the other hand, the scale of neutrino mass implied by the data creates a new hierarchy problem for particle physics. Why are neutrinos so light compared to the quarks and charged leptons? Our best tool for addressing this question is the neutrinoless double beta decay process, which can constrain the absolute value of the neutrino masses, and more importantly, may shed light on the origin of those masses. This talk will review the current status and future plans of double beta decay experiments in the US and abroad, with emphasis on the EXO experiment.