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COLLOQUIA DI DOTTORATO, A.A. 2024/2025

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A101, Dipartimento di Fisica  
Giovedì 20 febbraio 2025 ore 16:00

***Quantum superposition of  
neutrinos: a golden pathway to  
exploring the Yukawa Sector of  
the Standard Model***

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Neutrino oscillations were discovered in 1998, providing the first evidence for massive neutrinos. A breakthrough in 2012 with the discovery of  $\theta_{13}$  opened up a new field of research to study quantum superposition effects over macroscopic distances ( $>100$  km). In this seminar, this discovery will be presented and a new generation of experiments that study neutrino oscillations at large distances will be introduced.

These experiments -T2K, NoVA, JUNO, DUNE, and HyperKamiokande- have an ambitious goal: to fully determine the neutrino mass hierarchy and mixing parameters, which correspond to the lepton Yukawa sector of the Standard Model of Particle Physics. Results from ongoing experiments and expectations for the coming decade will be discussed.