



Contribution ID: 389

Type: **Invited Talk for Parallel Sessions (Invitation Only)**

AMoRE-II: Searches for neutrinoless double beta decay from 90 kg of Mo-100 using cryogenic calorimeters

Thursday, 29 May 2025 11:00 (25 minutes)

In recent decades, the neutrino physics has been a frontier field, advancing our understanding of nuclear and particle physics. Despite numerous experimental observations, some fundamental questions about neutrinos remain unanswered, such as their nature as Dirac or Majorana particles and their absolute mass scale. The search for neutrinoless double beta decay is a powerful tool to address these questions and has been ambitiously pursued worldwide. The AMoRE collaboration is conducting the AMoRE-II experiment, which will utilize approximately 90 kg of Mo-100, a promising candidate nucleus for this decay, embedded in an array of cryogenic calorimeters. This experiment builds upon the success of its predecessors, AMoRE-pilot and AMoRE-I, which set the most sensitive limit on the half-life of neutrinoless double beta decay from Mo-100. With the new underground experimental site in Yemilab, situated beneath a 1000-m-thick rock overburden, and rigorous efforts to achieve the background level of 10^{-4} counts/keV/kg/year in the signal region of interest, AMoRE-II aims to reach the sensitivity of 4.5×10^{26} years for the half-life of the decay from Mo-100. The current status and prospects of the experiment will be discussed in this presentation.

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Session Classification: Parallel Session

Track Classification: Neutrinos and Nuclei