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Experimental challenges in neutrinoless double beta decay search

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The search of neutrinoless double-beta decay plays a fundamental role in the understanding of neutrino physics. Its observation would prove that neutrinos are Majorana particles and that lepton number is not conserved, with a profound impact on elementary particle physics, nuclear physics, astrophysics, and cosmology. Experiments presently running will cover the quasi-degeneracy region of the neutrino mass pattern and the experimental challenge for the next future is the construction of detectors characterized by a tonne-scale size and an incredibly low background, to approach and fully probe the inverted-hierarchy region. In this presentation, a description of the most relevant experimental techniques is given and the strongest recent results are compared in terms of achieved background contributions and limits on effective Majorana mass, with a particular focus on the preliminary performances and results from the CUORE experiment. Finally, the most relevant parameters contributing to the experimental sensitivity are discussed and a critical comparison of the future projects is proposed.

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