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No neutrino Double beta decay Experiment - NvDEx

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Observing nuclear neutrinoless double beta decay (0νbb) would be a revolutionary result in particle physics. Observing such a decay would prove that the neutrinos are their own antiparticles, help to study the absolute mass of neutrinos, explore the origin of their mass, and may explain the matter-antimatter asymmetry in our universe by lepton number violation. We propose developing a time projection chamber (TPC) using high-pressure $^{82}\text{SeF}_6$ gas and Topmetal silicon sensors for readout in the China Jinping Underground Laboratory (CJPL) to search for neutrinoless double beta decay of ^{82}Se , called the NvDEx experiment. Besides being located at CJPL with the world's thickest rock shielding, NvDEx combines the advantages of the high Q value (2.996 MeV) of ^{82}Se and the TPC's ability to distinguish signal and background events using their different topological characteristics. This makes NvDEx unique, with great potential for low-background and high-sensitivity 0νbb searches. NvDEx-100, a NvDEx experiment phase with 100 kg of SeF_6 gas, is being built, with plans to complete installation at CJPL by 2026. This report will introduce the NvDEx concept and its advantages, and the progress of the NvDEx-100 construction.

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