

Probing Physics beyond the Standard Model with Reactor Neutrinos

Content :

Standard Model (SM) of particle physics is a successful theory, which has been confirmed by numerous experimental results. However, some of the anomalous observations and theoretical necessities call for extensions beyond the SM. We probe two of those theories using data of the TEXONO experiment taken at the Kuo-Sheng Reactor Neutrino Laboratory in Taiwan. The first is non-standard interactions (NSI), which is a model independent parameterization of beyond the SM electroweak theories between fermions described by an additional effective Lagrangian term to the SM Lagrangian. Current electron antineutrino – electron scattering measurements of TEXONO with 200 kg CsI(Tl) detector at 3 MeV threshold is sensitive to some of the non-universal (NU) and flavor changing (FC) parameters of the NSI. We present our limits to those parameters [1]. The second topic is on unparticle (UP) physics. We set limits on the vector and scalar UP coupling constants to neutrinos and electrons for various mass dimension parameter d by fixing and varying the energy scale $\Lambda_{\{u\}}$. In UP search we used electron antineutrino – electron scattering measurements from both our CsI(Tl) detector and 1 kg ultra low energy Germanium (ULE-Ge) detector at 10 keV threshold [2]. The current goal of the TEXONO experiment is to observe neutrino-nucleus coherent scattering with a point contact Germanium (PC-Ge) detector [3] in which case it is possible to put considerable bounds on neutrino-quark NSI parameters as well as improve our current UP results.

[1] M. Deniz et al., Phys. Rev. D 81, 072001 (2010)

[2] H. T. Wong, et al, Phys. Rev. D 75, 012001, (2007)

[3] H. T. Wong, Mod. Phys. Lett. A 23, 1431 (2008)

Primary authors : Mr. SINGH, Lakhwinder (Department of Physics, Banaras Hindu University, Varanasi 221005, India.)

Co-authors : Mr. SOMA, A.K. (Department of Physics, Banaras Hindu University, Varanasi 221005, India.) ; Dr. SINGH, V. (Department of Physics, Banaras Hindu University, Varanasi 221005, India.) ; Mr. SINGH, M.K. (Department of Physics, Banaras Hindu University, Varanasi 221005, India.) ; Dr. WONG, H.T. (Institute of Physics, Academia Sinica, Nankang, Taipei 11529, Taiwan.)

Presenter : Mr. SINGH, Lakhwinder (Department of Physics, Banaras Hindu University, Varanasi 221005, India.)

Session classification : --not yet classified--

Track classification : --not yet classified--

Type : --not specified--