

Searching for New Physics Signals from Timing Spectra at Neutrino Experiment

Friday 6 December 2019 17:30 (30 minutes)

We propose a novel strategy to search for new physics signals in timing spectra, envisioning the situation in which new particles come from the decay of a heavier mother particle with a finite particle width. For example, the timing distribution of events induced by the dark matter particle scattering at the detector may populate in a relatively narrow range, forming a “resonance-like” shape. Due to this structural feature, the signal may be isolated from the backgrounds, in particular when the backgrounds are uniformly distributed in energy and time. We analyze the existing data for the CsI detector of the COHERENT experiment with a timing cut and an energy cut, and find an excess in the timing distribution which can be explained by dark matter. Our new approach can be generally utilized for searching for new physics such as light dark matter or non-standard neutrino interaction in coherent neutrino scattering experiments including CCM, COHERENT, and JSNS².

Presenter: PARK, Jong-Chul (Chungnam National University)

Session Classification: Afternoon session II