Canadian Association of Physicists
Association canadienne des physiciens et physiciennes

Contribution ID: **3863** Type: **Invited Speaker / Conférencier(ère) invité(e)**

(I) The physics potential of next-generation long-baseline neutrino experiments

Wednesday 21 June 2023 13:45 (30 minutes)

Ever since the first measurements were made of these ghostly particles, neutrinos have been a constant fascination for physicists due to their unusual properties. One such peculiarity is that neutrinos can seemingly change flavours as they propagate —a phenomenon known as neutrino oscillation. The oscillation probabilities are determined by a set of fundamental parameters in the Standard Model. Decades of neutrino experiments designed to probe these parameters have narrowed down much of the phase space, yet many unanswered questions remain: Is there CP-violation in the lepton sector? Which neutrino is the lightest? Are there neutrinos beyond the three generations? The answers to these questions may hold the key to discovering physics beyond the Standard Model and understanding our universe, but answering them requires detectors much more powerful than those currently in operation. In this talk, I will focus on the two next-generation long-baseline neutrino experiments —Hyper-Kamiokande and the Deep Underground Neutrino Experiment (DUNE), and how they will be able to answer these questions. In addition, I will also discuss their wide-ranging physics potential, such as the study of Solar neutrinos, supernova neutrinos, and the search of proton decay.

Keyword-1

Neutrino

Keyword-2

Neutrino experiment

Keyword-3

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Session Classification: (PPD) W2-1 DM / Neutrino 3 | DM / Neutrino 3 (PPD)

Track Classification: Technical Sessions / Sessions techniques: Particle Physics / Physique des particules (PPD)