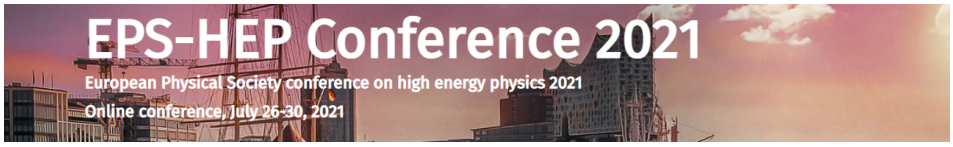

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Z-Boson Decays into (Heavy) Neutrinos: Dirac or Majorana?

Wednesday 28 July 2021 10:50 (20 minutes)

Recently Z factories have been proposed with the capability to produce more than 10^12 Z bosons. It has been observed that this opens the possibility to observe the decay of the Z into a light neutrino and a heavy neutrino, Z –> vN, down to very small (10^{-11}) light-heavy neutrino mixing angles and up to masses close to the Z mass. The question of whether the heavy neutrino is a Dirac particle (conserving lepton number) or a Majorana particle (leading to violation of lepton number conservation) is raised and analyzed, with the following conclusion: in spite of the fact that it is not possible to distinguish the two hypotheses on an event by event basis, it is possible to build two observables, the charge asymmetry and the polarization analysis, which, given sufficient statistics, would allow a significant determination of the nature of the heavy neutrino.

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