

## Right-Handed neutrino searches at the FCC

*Saturday 7 July 2018 14:15 (15 minutes)*

CERN has launched in 2014 the design study of Future Circular Colliders, including a High Luminosity  $e+e-$  collider (FCC-ee) running from the Z pole to above the top pair production threshold. Follow a 100 TeV pp and heavy ion collider (FCC-hh) able to reach an unprecedented energy scale and an e-p collider option. The FCC-ee offers a broad discovery potential based on a combination of precision Electroweak Measurements, high statistics quark and lepton flavour physics, searches for rare phenomena and new particles, and Higgs model-independent coupling measurements. The FCC-hh can observe the production new particles with Standard Model couplings up to  $\sim 30$  TeV, but is also an extremely abundant factory for W, Z top and Higgs, allowing searches for rare phenomena and a number of precision measurements including those of the triple Higgs and ttH couplings. The ep option would offer unprecedented reach in structure functions and high statistics of Higgs production.

The complementarity of the FCC machines can be illustrated in a spectacular way for particular example of heavy neutral leptons (Right Handed neutrinos), which constitute today one of the most compelling extensions of the Standard Model, if their masses are around the Electroweak scale. While the FCC-ee offers the largest discovery domain by either the very clean observation of long lived particles in  $Z \rightarrow \nu N$  decays, or by a typical pattern of deviations in a series of precision observables, the FCC-hh (or ep) could detect them in  $W \rightarrow l N$  (or  $e \rightarrow N$  Charged current transition) followed by the semileptonic decay of the Heavy Neutral lepton, thus able to observe possible change of lepton flavour or even leptonic number.

**Author:** BLONDEL, Alain (Universite de Geneve (CH))

**Presenter:** BLONDEL, Alain (Universite de Geneve (CH))

**Session Classification:** Neutrino Physics

**Track Classification:** Neutrino Physics