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Status of heavy neutrino searches at ep colliders

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The extension of the SM of particle physics by sterile neutrinos explains the smallness of neutrino masses as observed by the neutrino oscillation experiment. Since the mass scale of the sterile neutrinos is unconstrained, it is useful to discuss experimental motivated predictions for specific mass scale. Sterile neutrinos can be tested at particle colliders in three different mass ranges
MN < MW, where the sterile neutrinos can be long lived and can be tested via its displaced distance.
MN ˜ EW scale; around this mass scale the sterile neutrinos can be tested via lepton number or lepton flavor violation processes.
MN > O(TeV); sterile neutrinos can be tested indirectly via its contribution to loop processes, e.g. Z -> mu e, mu-> 3e, etc.
In this talk, we investigate the sensitivity of the proposed Large Hadron Electron collider (LHeC) and the Future Circular Collider (FCCeh) to sterile neutrino searches for the three mass scales.

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