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Low Energy Signatures of the TeV Scale See-Saw Mechanism

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We study a type I see-saw scenario where the right-handed (RH) neutrinos, responsible for the light neutrino mass generation, lie at the electroweak scale. Under certain conditions, the strength of the charged (CC) and neutral current (NC) weak interactions of the Standard Model particles with the heavy RH neutrinos can be large enough to allow the production of the latter at the LHC, opening also the possibility of observing other low energy signatures of the new physics in the electroweak precision observables as well as in searches for rare leptonic decays or neutrinoless double beta decay. We show that the present bound on the mu –> e + gamma decay rate makes very difficult the observation of the heavy RH neutrinos at the LHC or the observation of deviations from the Standard Model predictions in the electroweak precision data. We also show that all present experimental constraints on this scenario still allow i) for an enhancement of the rate of neutrinoless double beta decay, which thus can be in the range of sensitivity of the GERDA experiment even when the light Majorana neutrinos possess a normal hierarchical mass spectrum, and ii) for the predicted mu –> e+ gamma decay rate to be within the sensitivity range of the MEG experiment.

Auteurs principaux: Prof. IBARRA, Alejandro (TUM); Dr MOLINARO, Emiliano (CFTP - IST); Prof. PETCOV, Serguey (SISSA)

Orateur: Dr MOLINARO, Emiliano (CFTP - IST)

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