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P3.047 Neutrinos with a linear seesaw mechanism in a scenario of gauged B − L symmetry

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We present a model for explaining neutrino masses. The following are the elements we add to the Standard Model (SM):

- A new gauge group (i.e., a new gauge boson, B'). The corresponding charges of SM fermions are their differences of Baryon and Lepton number, B − L.
- Three neutrinos per family (ν_R, S, S').
- Two scalar complex fields: one doublet of $SU(2)_L$, H, and a singlet of the SM gauge group, χ. (In total, six new scalar components.)

After studying the scalar potential of this model we found the conditions that allow a degenerate vacuum state, yielding Vacuum Expectation Values (VEV) for the SM Higgs, as well as for H and χ. We fixed the $B - L$ charges of the new fields in order to construct a Yukawa sector which, after expressed around the above mentioned VEVs, yields the neutrinos mass matrix which implies that masses of active neutrinos obey the regime of Linear Seesaw Mechanism; in particular, the small parameter typical of this regime is proportional to the VEV of H. On the other hand, it appeared six mass states of heavy neutrinos whose masses are proportional to the VEV of χ, v_x. The ten scalar mass states split into four Goldstone Bosons, the SM Higgs (with a mass easily adjustable around 125 GeV) and five heavy states, whose masses are also proportional to v_x. Finally, the kinetic terms of scalars originate five mass vector states: the four ones of SM plus $Z' \tilde{-} B'$, whose mass is also proportional to v_x. In summary, all the new heavy masses are due to this single parameter. We studied the predictions of this model concerning to processes with Lepton Number Violation, which, after some numerical assumptions, demand that $v_x \geq 35$ TeV. Also, we studied both the production and decay of new particles.