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Unified framework for B-anomalies, muon g-2 and neutrino masses

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We present a model of radiative neutrino masses which also resolves anomalies reported in B-meson decays, $R_{D^{(\star)}}$ and $R_{K^{(\star)}}$, as well as in muon $g-2$ measurement, Δa_μ. Neutrino masses arise in the model through loop diagrams involving TeV-scale leptoquark (LQ) scalars R_2 and S_3. Fits to neutrino oscillation parameters are obtained satisfying all flavor constraints which also explain the anomalies in $R_{D^{(\star)}}$, $R_{K^{(\star)}}$ and Δa_μ within $1\,\sigma$. An isospin-3/2 Higgs quadruplet plays a crucial role in generating neutrino masses; we point out that the doubly-charged scalar contained therein can be produced in the decays of the S_3 LQ, which enhances its reach to 1.1 (6.2) TeV at $\sqrt{s} = 14$ TeV high-luminosity LHC ($\sqrt{s} = 100$ TeV FCC-hh). We also find that the same Yukawa couplings responsible for the chirally-enhanced contribution to Δa_μ give rise to new contributions to the SM Higgs decays to muon and tau pairs, with the modifications to the corresponding branching ratios being at (2–6)\% level, which could be tested at future hadron colliders, such as HL-LHC and FCC-hh.

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