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Anomaly-free Abelian gauge symmetries with Dirac seesaws

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We perform a systematic analysis of Standard Model extensions with an additional anomaly-free gauge $U(1)$ symmetry, to generate tree-level Dirac neutrino masses. An anomaly-free symmetry demands nontrivial conditions to the charges of the unavoidable new states. An intensive scan was performed, looking for solutions generating neutrino masses by the type-I and type-II tree-level Dirac seesaw mechanism, via operators with dimension 5 and 6, that correspond to active or dark symmetries. Special attention was paid to the case featuring no extra massless chiral fermions.

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