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Type-X two Higgs doublet model in light of muon g-2: confronting the Higgs and collider data

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The recent Fermilab measurement of the muon anomalous magnetic moment yields about 4.2 sigma deviation from the SM prediction. In the Type-X two Higgs doublet model with the Higgs alignment, we study the consequence of imposing the observed muon g-2, along with the theoretical stabilities, electroweak oblique parameters, Higgs precision data, and direct searches at the LEP and LHC. We found that the constraints are very strong, restricting other new scalar boson masses below about 300 GeV. We also show that the observed electron anomalous magnetic moment is consistent with the model prediction and the associated production of a pseudoscalar boson and CP-even scalar boon at the LHC has a high potential to probe the whole surviving parameter space.

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