Contribution ID: **46** Type: **Parallel talks**

Muon and electron (g – 2) anomalies with non-holomorphic interactions in MSSM

Tuesday 18 July 2023 16:40 (20 minutes)

Accommodating differing signs of the supersymmetric contributions to $g-2$ values of muon and electron can be difficult in the Minimal Supersymmetric Standard Model (MSSM) in the context of Fermilab muon $(g-2)_\mu$ data and electron $(g-2)_e$ result as obtained from the fine structure constant (α) measurement through ^{133}Cs matter-wave nterferometry. The latter would mean a negative SUSY contribution to $(g-2)_e$.
The issue of simultaneously satisfying the two leptonic magnetic moments does not arise for the positive $(g-2)_e$ case coming from a ^{87}Rb based experiment to
measure α. The results of the two α experiments disagree among themselves. A future measurement may resolve the anomaly. We focus on the case of negative $(g-2)_e$ to explore MSSM models with non-holomorphic (NH) soft terms. A large and negative non-standard trilinear coupling A'_e value accommodates $(g-2)_e$ via bino-selectron loop contributions. On the other hand, large values of A'_e is allowed via the highly accommodative charge-breaking constraint corresponding to a four-vev scenario where one adds the contributions from the soft terms with A'_e on the top of the terms of charge breaking potential of MSSM. Additionally, there is also radiative enhancement of electron Yukawa coupling due to A'_e. Apart from the two leptonic magnetic moments, we consider dark matter constraints via a higgsino type of lightest supersymmetric particle while having a large Wino mass and take the left and right slepton mass parameters for the first two generations to be the same.
We identify the available parameter space while also satisfying the ATLAS data from slepton pair production as well as the same from compressed higgsino searches.
(Ref: Eur.Phys.J.C 83 (2023) 1, 60 • e-Print: 2112.09867 [hep-ph])

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Session Classification: SUSY: Phenomenology and Experiment

Track Classification: SUSY: Phenomenology and Experiment