



Contribution ID: 54

Type: **Parallel talk**

## ALP explanation to the muon ( $g-2$ ) and its test at future Tera-Z and Higgs factories

*Tuesday, 4 July 2023 17:00 (25 minutes)*

Models with an axionlike particle (ALP) can provide an explanation for the discrepancy between experimental measurement of the muon anomalous-magnetic moment  $(g-2)_\mu$  and the Standard Model prediction. This explanation relies on the couplings of the ALP to the muon and the photon. We also include more general couplings to the electroweak gauge bosons and incorporate them in the calculations up to the 2-loop order. We investigate the existing experimental constraints and find that they do not rule out the ALP model under consideration as a possible explanation for the  $(g-2)_\mu$  anomaly. At the same time, we find the future Tera-Z and Higgs factories, such as the CEPC and FCC-ee, can completely cover the relevant parameter space through searches with final states  $(\gamma\gamma)\gamma$  ( $\mu^+\mu^-$ )  $\gamma$ , and  $(\mu^+\mu^-)$   $\mu^+\mu^-$ .

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**Session Classification:** Parallel talks 2: Electroweak Interactions