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Precision test of the muon-Higgs coupling at a high-energy muon collider

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We explore the sensitivity of directly testing the muon-Higgs coupling at a high-energy muon collider. This is strongly motivated if there exists new physics that is not aligned with the Standard Model Yukawa interactions which are responsible for the fermion mass generation. We illustrate a few such examples for physics beyond the Standard Model. With the accidentally small value of the muon Yukawa coupling and its subtle role in the high-energy production of multiple (vector and Higgs) bosons, we show that it is possible to measure the muon-Higgs coupling to an accuracy of ten percent for a 10 TeV muon collider and a few percent for a 30 TeV machine by utilizing the three boson production, potentially sensitive to a new physics scale about $\Lambda \sim 30 - 100$ TeV.

In-person participation

No

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