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Multi Higgs Boson Signals of a Modified Muon Yukawa Coupling at a Muon Collider

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SMEFT is an efficient tool to parametrize the effect of BSM physics in a model-independent way. We study di-Higgs and tri-Higgs productions at the muon collider which is parametrized by the dimension 6 mass operator. We also study di-boson and tri-boson processes which also include the production of Goldstone bosons. We discuss possible model dependence of multi-boson processes resulting from other dimension 6 operators and identify that multi-Higgs processes could be a golden channel for studying deviation in muon Yukawa coupling. Finally, we extend the study to two Higgs doublet model type-II and show that cross-sections for multi-Higgs productions involving heavy Higgs bosons can be enhanced up to by a factor of $\tan^6 \beta$ which could be very sensitive probe of deviation in muon Yukawa coupling.

Author: LEE, Taegyu (Indiana University)

Co-authors: HERMANEK, Keith (Indiana University); Dr NAVIN, Mcginnis (Arizona university); DERMISEK, Radovan (Indiana University); YOON, Sangsik (Indiana University)

Presenter: LEE, Taegyu (Indiana University)

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