



Contribution ID: 218

Type: **Oral presentation (in person)**

Higgs Production at $\mu^+ \mu^+$ Colliders

Tuesday, 9 July 2024 11:45 (15 minutes)

Muon colliders offer exciting new opportunities to explore the Standard Model and beyond by unifying the energy and precision frontiers, thus also facilitating deeper insight into the Higgs sector central to the Standard Model. In this work, motivated by recent developments in anti-muon cooling, we explore the prospects of Higgs production at $\mu^+ \mu^+$ colliders. At high energies, Higgs production is dominated by WW-fusion, which for $\mu^+ \mu^+$ colliders occurs via splitting of an intermediate photon into a $W^+ W^-$ pair. However, collinear photon emissions lead to numerical instabilities that make computations using event generators difficult. We therefore propose splitting the phase-space into the sum of a non-collinear region calculable using event generators, and a collinear region approximated by a parton distribution function for the photon. We thus find that the cross-section for Higgs-production at $\mu^+ \mu^+$ colliders is almost as big as for $\mu^+ \mu^-$ colliders, and in particular for polarized anti-muons, is only smaller by a factor of about two. Hence, we argue that $\mu^+ \mu^+$ colliders offer a great opportunity as Higgs factories to be constructed in the not-too-distant future.

Apply for poster award

Primary authors: TAKAURA, Hiromasa (KEK); Mr TREUER, Lukas (KEK, The Graduate U. Adv. Studies (SOKENDAI)); TAKAI, Ryoto (KEK, The Graduate U. Adv. Studies (SOKENDAI)); KITANO, Ryuichiro; MATSUDO, Ryutaro (KEK); OKAWA, Shohei (KEK); HAMADA, Yu (DESY)

Presenter: Mr TREUER, Lukas (KEK, The Graduate U. Adv. Studies (SOKENDAI))

Session Classification: Higgs, Electroweak

Track Classification: Physics and Detector: Higgs, Electro-Weak