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# Precision in New Physics searches at future electron-positron and muon colliders

Future colliders (electron-positron colliders like CEPC, CLIC, FCC-ee, ILC, muon colliders MuC, and hadron colliders FCC-hh) are being designed to tackle several riddles in modern particle physics: dark matter, missing CP violation, neutrino masses, the origin of the flavor structure and electroweak symmetry breaking. To determine their physics potential, precise predictions for new physics signals and known-physics backgrounds are needed. The project aims at the study of precision prediction of new physics signals for SM effective field theory (SMEFT) for FCC-ee/ILC and MuC together with their Standard Model backgrounds using modern multi-purpose Monte Carlo event generators, specifically in multi-Higgs and associated Higgs production channels. The project allows to learn next-to-leading order QCD and electroweak corrections, QED and electroweak lepton PDFs, simulation of beam shapes like beam spread and event selection on infrared-safe inclusive observables. Also, loop-induced processes will be investigated.

## Group

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## Project Category

B4. Theory of Elementary Particles

## Special Qualifications

Quantum Mechanics I+II, Particle Physics basics, ideally a Quantum Field Theory course

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