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muTRISTAN

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The ultra-cold muon technology developed for the muon g − 2 experiment at J-PARC provides a low-emittance mu+ beam which can be accelerated and used for realistic collider experiments. We consider the possibility of new collider experiments by accelerating the mu+ beam up to 1 TeV. Allowing the mu+ beam to collide with a high-intensity e− beam at the TRISTAN energy, 30 GeV, in a storage ring with the same size as TRISTAN (a circumference of 3 km), one can realize a collider experiment with the center-of-mass energy 346 GeV, which allows the production of Higgs bosons through vector boson fusion processes. We estimate the deliverable luminosity with existing accelerator technologies to be at the level of 5 x 10ˆ33 cmˆ−2 sˆ−1, with which the collider can be a good Higgs boson factory. mu+mu+ colliders up to $\sqrt{s} = 2$ TeV are also possible using the same storage ring. I will explain the design of this proposed collider briefly, and discuss the Higgs production and possible new physics searches.

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