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A phenomenological study of Higgs Jets at a Muon Collider

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A muon collider provides an interesting opportunity to test various aspects of Higgs physics and potential BSM models. For a muon collider, Vector-boson fusion provides the dominant channel for the production of Higgs bosons. We calculate the lowest and higher order Higgs jet distribution as a function of jet invariant mass for the super-renormalizable splitting $h \to hh$ and compare it to the background QCD jet distribution calculated from the NLL resummed cross section for $e^+ e^-$ annihilation. The qualitative difference between the two distributions shows up distinctly at collider center of mass energies greater than 10 TeV as the peak of the QCD jets is pushed off to higher invariant jet masses, making it easier to observe the super-renormalizable and ultra-collinear $h \to hh$ jet distribution. This can also prove to be an important channel to test potential BSM models.

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