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Different-sign Longitudinally Polarized WW Scattering at the Muon Collider

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Longitudinally polarized Vector Boson Scattering (VBS) process provides us with a perfect probe to precisely measure electroweak observables and Higgs coupling as massive vector bosons have longitudinally polarized components originating from the Higgs mechanism. A TeV-scaled muon collider that would effectively be a “high-luminosity weak boson collider” , has great potential to measure VBS processes. In this research, we choose $W+W^-$ scattering to validate the feasibility of the muon collider from the physical side using multi-variable analysis method. The significance of longitudinally polarized $W+W^-$ can obtain a 5 standard deviation discovery at a 14 TeV muon collider, which shows good potential to reach the first longitudinally polarized WW scattering discovery on a muon collider.

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