

Search for Contact Interactions in Dilepton Channels at the Compact Muon Solenoid

Tuesday, August 15, 2017 11:30 AM (20 minutes)

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Presently, the Standard Model (SM) states that there exists three generations of quarks and leptons. Each generation is distinguished by the fermion rest mass where higher generations have higher masses. Under the SM, $q\bar{q} \rightarrow l^- l^+$ follow the Drell-Yan (DY) process. If the process were to also follow a Contact Interaction (CI) model, it would be the first evidence for quark/lepton compositeness. This implies quarks and leptons are composed of yet more elementary particles, which are sometimes called preons. Using Monte Carlo simulation we can demonstrate the asymmetries between the DY and CI models. Specifically, the invariant mass spectra of dilepton events and the Collin-Soper angle distribution show significant variation between the two models. From there, the simulation is compared to data. In the absence of evidence for CI, higher limits can be set for the energy threshold for compositeness.

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