Search for Scalar and Vector Third Generation Leptoquarks with one $\tau$ Decaying to a Muon

STAN FORRESTER, University of California, Davis

At Run II of the Fermilab Tevatron, the CDF experiment provides good sensitivity for either discovery or setting limits on 3rd generation scalar and vector leptoquark ($LQ_3$) pair-production, where each leptoquark decays $LQ_3 \rightarrow \tau b$. The estimated cross section at the Tevatron for this process is 1 pb for scalar (vector) $LQ_3$ masses of 135 ($\sim$200, depending on coupling) GeV/c$^2$. We perform a search for such production in the $(\tau \rightarrow \mu) + \tau h$ channel using about 400 pb$^{-1}$ of data taken at $\sqrt{s} = 1.96$ TeV.

Wang Song Ming
University of Florida

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