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New search strategies for composite quark partners at the LHC Run II

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Composite Higgs Models predict quark partners at the TeV scale which can be produced at the LHC Run II. The decay of such heavy quark partners lead to highly boosted objects in the final state (e.g. tops, Higgses and electroweak gauge bosons) which require refined search strategies. In this talk we propose boosted object searches which utilizes a simplified b-tagging procedure and the Template Overlap Method to tag the massive boosted objects and reject the corresponding backgrounds. In addition, we propose a new, pileup insensitive method, to tag forward jets which characterize our signal events. We show that this search strategy offers a new window to both detecting and measuring quark partners of mass up to ~ 2 TeV.

Based on:

M.Backović, T.Flacke, S.J.Lee and G.Perez,

“LHC Top Partner Searches Beyond the 2 TeV Mass Region,” arXiv:1409.0409 [hep-ph]

M.Backović, T.Flacke, J.H.Kim and S.J.Lee,

“Detecting Composite Quark Partners in Boosted Higgs Searches at LHC Run II,” arXiv:1410.xxxx [hep-ph]

M.Backović, T.Flacke, J.H.Kim and S.J.Lee,

“Searching for Boosted Tops and Boosted Higgses from Composite Top Partner decays at LHC Run II,” (work in progress)

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