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Top quark forward-backward asymmetry and W' prime bosons

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Abstract:

The top quark forward-backward asymmetry measured at the Fermilab Tevatron collider deviates from the standard model prediction. A W' prime boson model is described, where the coupling W' prime-t-d is fixed by the $t\bar{t}$ forward-backward asymmetry and total cross section at the Tevatron. We show that such a W' prime boson would be produced in association with a top quark at the CERN Large Hadron Collider (LHC), thus inducing additional $t\bar{t}+j$ events. We use measurements of $t\bar{t}+n$ -jet production from the LHC to constrain the allowed W' prime-t-d couplings as a function of W' prime boson mass. We find that this W' prime model is constrained at the 95% C.L. using 0.7 fb^{-1} of data from the LHC, and could be fully excluded with 5 fb^{-1} of data.

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