

Discerning a new physics in $t\bar{t}$ production from spin observables

Monday, 4 June 2012 17:40 (0:20)

Abstract content

Intensive production of top anti top pairs at hadronic colliders enable measurements of cross-section, forward-backward asymmetry, charge asymmetry, invariant mass distribution, top -anti-top spin-spin correlations. Due to the forward-backward asymmetry deviation of the Standard model predictions many models of new physics were invented to explain this puzzle. We consider impact of the axigluon, color triplet and sextet weak singlets, weak isodoublet scalar, flavour-changing neutral Z' and charged W' vector bosons on the existing observables. Among considered model only axigluon can reproduce all Tevatron observables, without being inconsistent with the LHC result on charge asymmetry and recent top-spin correlation measurement by ATLAS, while the color triplet and sextet cannot explain CDF results on top-anti- top invariant mass measurements at Tevatron. Existing observables exclude W' and Z' explanation of the Tevatron FBA anomaly. Scalar models result in notable deviations in several spin observables in particular for the “helicity” spin quantization axis. Precise measurement of these spin observables might differentiate between isodoublet color triplet models. Axigluon has insignificant effect on top spin observables at both colliders.

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Session Classification : BSM

Track Classification : Particles