

Toponium at the LHC

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Measurements of the dileptonic $t\bar{t}$ events at the LHC found excesses over the SM simulations at small azimuthal angle separation and small invariant mass region. We examine the possibility of those excesses as consequences of non-perturbative enhancement of the $t\bar{t}$ production cross section near the threshold. While sub-dominant in terms of total rates, so-far neglected toponium effects yield additional $t\bar{t}$ pairs in color and spin singlet, giving rise to dileptons with small invariant mass and small azimuthal angle separation. This could contribute to the above-mentioned deviations from the present event simulation that accounts only for perturbative corrections. We propose a method to discover toponium in present and future data, which should improve the precision measurement of the top quark mass at the LHC.

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