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Title: Testing the violation of Bell inequalities in $t\bar{t}$ and W^+W^- pair.

Abstract: When massive particle pairs with spin are produced at colliders their spins are correlated. Furthermore, when the particle pair system is interpreted as a quantum state, the system can exhibit entanglement and can violate Bell's inequality. From theoretical point of view, testing entanglement at colliders requires us to choose the spin axis properly and define a quantum state (spin density matrix) in the first place. The commonly used event-by-event axis choice can introduce basis dependence of angular averaged observables. From phenomenological point of view, the spin of the $t\bar{t}/W^+W^-$ cannot be measured directly. One needs to determine the spin density matrix of $t\bar{t}/W^+W^-$ pair from their decay final states that are detectable, and then choose a proper observable to test the Bell's inequality.