

PARTICLE PHYSICS SEMINAR SERIES

Hunting for Maverick Top Partners

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Most searches for vector-like top partners (T) are concerned with the pair and single productions, strictly focusing on three conventional T decays (i.e. $t Z$, $t h$ and $W b$). As bounds become increasingly stringent, however, the utility of these channels greatly diminish. There is a class of “maverick top partners” with non-traditional decays and productions, which can easily be dominant with minor tweaks to the simplest top partner models. First, we consider a simplified renormalizable model with the $SU(2)$ singlet T and an additional gauge singlet scalar S . The messenger S plays a role of linking the T and top quark, giving rise to non-standard decays and productions of T at loop-level. Second, we identify the T as a portal matter dually charged under the SM and dark $U(1)_d$ gauge symmetry. In this scenario, the T preferentially decays into dark photons and dark Higgs in a large region of parameter space. All of these open new final states of T that have not yet been searched for.



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