

Exotic Vector-Like Quark Phenomenology in the Minimal Linear Sigma Model

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Extensions of the Standard Model that include vector-like quarks commonly also include additional particles that may mediate new production or decay modes. Using as example the Minimal Linear Sigma Model, that reduces to the minimal $SO(5)/SO(4)$ Composite Higgs Model in a specific limit, we consider the phenomenology of vector-like quarks when a scalar singlet (s) is present. This new particle may be produced in the decays $T \rightarrow t s$, $B \rightarrow b s$, where T and B are vector-like quarks of charges $2/3$ and $-1/3$, respectively, with subsequent decay $s \rightarrow W^+ W^-$, ZZ , hh . By scanning over the allowed parameter space we find that these decays may be dominant. In addition, we find that the presence of several new particles allows for single T production cross sections larger than those expected in minimal models. We discuss the observability of these new signatures in existing searches.

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