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Neutral triple gauge boson vertices and fermionic UV models

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Searches for anomalous neutral triple gauge boson couplings (NTGCs) provide important tests for the gauge structure of the standard model. In SMEFT NTGCs appear at the level of dimension-8 operators. We point out that the complete matching of UV models requires four different CP-conserving $d = 8$ operators and that the single CPC $d = 8$ operator, most commonly used by the experimental collaborations, does not cover all vertices. Despite stringent experimental constraints on NTGCs, limits on the scale of UV models are relatively weak, because their contributions are doubly suppressed, being $d = 8$ and 1-loop. We suggest a series of benchmark UV scenarios suitable for interpreting searches for NTGCs in the upcoming LHC runs and discuss current and future limits.

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