## 9th International Conference on High Energy Particle and Nuclear Physics in the LHC Era



Contribution ID: 465

Type: Plenary

## Neutral triple gauge boson vertices, EFT and LHC

Friday 10 January 2025 09:05 (35 minutes)

Searches for anomalous neutral triple gauge boson couplings (NTGCs) provide important tests for the gauge structure of the standard model. In SMEFT ("standard model effective field theory") NTGCs appear only at the level of dimension-8 operators. While the phenomenology of these operators has been discussed extensively in the literature, renormalizable UV models that can generate these operators are scarce. In this work, we study a variety of extensions of the SM with heavy fermions and calculate their matching to d = 8 NTGC 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 describe all possible NTGC form factors. 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, obtain their current limits and provide estimates for the expected sensitivity of the high-luminosity LHC.

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