Contribution ID: **419** Type: **Theory poster**

The Top-quark electro-weak couplings after LHC run2

Thursday, June 10, 2021 6:45 PM (1 hour)

Being the heaviest particle of the model, with a mass close to the electroweak scale, the top quark is an interesting candidate for searching for new physics. The electroweak couplings of the top quarks are specially relevant in many extension of the Standard Model. Indeed, as the top-quark was not produced in the previous generation of electron-positron colliders most of its electro-weak couplings can only be constrained with the actual data coming from the Large Hadron Collider. In order to analyse if there is still room for new physics in the electro-weak couplings of the top-quark, we perform a global fit to these couplings. Following the Standard Model Effective Field Theory formalism we have constrained the Wilson coefficients of the dimension six operators that affect the top-quark electro-weak couplings. In this work we consider, for the first time, the QCD corrections at NLO for most of the processes included. Furthermore, we have included recently measured processes, such as $pp \to tZq$ and $pp \to t\gamma q$., and the first differential measurements in $pp \to t\bar{t}Z$ and $pp \to t\bar{t}\gamma$ production. Taking this into account we are able to improve the bounds significantly with respect to previous results.

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Session Classification: Poster Session

Track Classification: Top physics