

Resummation effects in HECO pair production at the LHC: UFO implementation

Various theories that lie beyond the Standard Model include the existence of high-electric-charge objects (HECOs), examples of which are Q-balls and aggregates of ud-or s-quark matter. Due to the large coupling, the perturbation theory breaks down. Nevertheless, one can resum the QED corrections at a UV fixed point for high electric charge ($g \geq 11 e$) and mass values.

In this work, HECO is assumed to be a spin-1/2 Dirac fermion which couples to photon and Z boson. At colliders, HECO can be pair-produced via Drell-Yan and photon-fusion processes. The Universal FeynRules Output (UFO) implementation - including resummation effects - has been performed for both production mechanisms, thus being available for Monte Carlo generators such as MadGraph5. The UFO models were successfully validated by comparing cross-section values obtained by analytical calculations through Wolfram Mathematica and the ones computed by Madgraph.

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