

On Drell-Yan production of leptoquarks coupling to heavy quark flavours

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Given the hints of lepton-flavour non-universality in semi-leptonic B decays, leptoquark (LQ) models with sizeable couplings to heavy quark flavours are enjoying a renaissance. While such models are subject to stringent constraints from low-energy experiments also bounds from non-resonant dilepton searches at the Large Hadron Collider (LHC) turn out to be phenomenologically relevant. Based on the latest LHC dilepton analyses corresponding to an integrated luminosity of around 140 fb^{-1} of proton-proton collisions at $\sqrt{s} = 13 \text{ TeV}$, we present improved limits on the scalar $\tilde{L}Q$ couplings that involve heavy quark flavours and light or heavy $\tilde{\nu}$ dileptons. In particular, we show that effects beyond the leading order that are related to real QCD emissions are relevant in this context, since the inclusion of additional heavy-flavoured jets notably improves the exclusion limits that derive from the high-mass dilepton tails. A dedicated Monte Carlo code within the `{tt POWHEG-BOX}` framework that allows for an on-the-fly signal event generation including all LQ corrections we considered is introduced.

Author: SCHNELL, Luc (Max Planck Institute for Physics)

Presenter: SCHNELL, Luc (Max Planck Institute for Physics)

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