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Leptoquark-portal Dark Matter and the B-Meson Anomalies at the LHC JETHRO GAGLIONE, ALFREDO GURROLA, Vanderbilt Univ — One of the most notable downfalls of the standard model (SM) and some of its theoretical extensions is the inability to provide a Dark Matter (DM) particle candidate with characteristics such that $DM + DM \leftrightarrow SM + SM$ interactions in the early universe produce the correct DM relic density measured from astronomy probes. Here we focus on a theoretical extension that predicts a new scalar or vector boson, referred to as a leptoquark (LQ) in the literature. The LQ enables quark-lepton interactions at high energy scales, thus carries both lepton and baryon number. LQ models can produce the correct DM relic density via a coannihilation (CA) mechanism, where CA refers to DM interactions with other particles, mediated by a LQ, and that result in the production of SM particles. LQ models are also a potential explanation for the recently observed anomalies in B-meson decays, where a $\sim 4\sigma$ deviation from SM predictions is observed. We explore some of the properties of LQs as well as their discovery potential at the CERN large hadron collider (LHC) using vector boson fusion processes, with focus on regions with small mass differences Δm between the LQ, DM, and its CA partner (known as compressed mass spectra regions).

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