

Measuring V_{td} at the LHC

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We propose a direct measurement of the CKM element V_{td} at the LHC. Taking profit of the imbalance between d and d^* quark content in the proton, we show that a non-zero V_{td} induces a charge asymmetry in the tW associated production. The main backgrounds to this process, $t\bar{t}$ production, and tW associated production mediated by V_{tb} , give charge symmetric contributions at leading order in QCD. Therefore, using specific kinematic features of the signal, we construct a charge asymmetry in the di-lepton final state which, due also to a reduction of systematic uncertainties in the asymmetry, is potentially sensitive to V_{td} suppressed effects. In particular, using signal and background simulations up to detector level, we show that this new observable could improve the current direct upper bound on $|V_{td}|$ already with existing LHC data. We also project that $|V_{td}|$ values down to ~ 10 times the Standard Model prediction could be probed in the high luminosity phase of the LHC.

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