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# CKM determination from W decays with Jet tagging at CEPC

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We present a study projecting the sensitivity of measuring Cabibbo–Kobayashi–Maskawa (CKM) matrix elements at the CEPC, via direct observation of semi-leptonic WW decays at a center-of-mass energy \(\sqrt{s} = 240\ \text{GeV}\). This analysis focuses on determining six CKM matrix elements, including \(|V_{cd}|\), \(|V_{cs}|\), \(|V_{cb}|\), \(|V_{ud}|\), \
and \(|V_{ub}|\), and further enables tests of CKM unitarity. By employing state-of-the-art jet flavor taggers, we assess the expected measurement precision. Our results indicate that the CEPC has the potential to significantly enhance the sensitivity to \(|V_{cs}|\) and \(|V_{cb}|\), while also providing constraints on the full set of six matrix elements and enabling rigorous tests of their unitarity. However, the achievable performance is found to strongly depend on the level of systematic uncertainties related to the parameters of flavor taggers.

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