

QED factorization of two-body non-leptonic and semi-leptonic B to charm decays

Wednesday, 22 September 2021 16:30 (15 minutes)

Two-body non-leptonic B decays with heavy-light final states, like $B_s \rightarrow D\pi$ and $B \rightarrow DK$, are among the theoretically cleanest non-leptonic decays as penguin loops do not contribute. They can be described using QCD factorization which relies on the heavy quark expansion. Advancing the theoretical calculations of such decays requires also a careful analysis of QED effects. In this talk we present a treatment of both virtual and ultrasoft real QED effects within a $\text{QCD} \times \text{QED}$ factorization framework of the non-leptonic and semi-leptonic B to D decays. In particular, due to recent discrepancies between theory and experimental data, we focus on ratios of non-leptonic over semi-leptonic decay rates, which are theoretically clean observables as the form factor dependence drops significantly. We found QED corrections to the amplitude to be at the sub-percent level, while at the level of the rate, ultrasoft photon effects can produce a correction up to a few percent, requiring a careful treatment of such effects in the experimental analyses.

Do you wish to attend the workshop on-site?

yes

Summary

Primary authors: BENEKE, Martin (Physik Department T31, TUM); FINAURI, Gael (Physik Department T31, TUM); BÖER, Philipp (Physik Department T31, TUM); VOS, K. Keri (Nikhef, Amsterdam. GWFP, Maastricht University)

Presenter: FINAURI, Gael (Physik Department T31, TUM)

Session Classification: Parallel Session: Phenomenology

Track Classification: Particle Phenomenology