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## Radiative corrections to $B \rightarrow \ell \nu$

In this talk I will focus on the study of the leptonic  $B \rightarrow \ell \nu$  decay at next-to-leading order in QED. The future improvements of experimental measurements of this channel require a reliable theory prediction, hence a careful theoretical estimate of QED corrections. The multi-scale character of this process requires an appropriate effective theory (EFT) construction to factorize the different contributions. In the first part of this talk, I will discuss the EFT description of the process at the partonic level, which is based on Heavy Quark Effective Theory and Soft Collinear Effective Theory. I will show how the inclusion of QED corrections demands a generalisation of the hadronic decay constant defining a new non-perturbative input. In the second part of the talk, I will discuss the EFT description below the confinement scale based on the Chiral Lagrangian including Heavy Mesons ( $B$  and  $B^*$ ). I will show that depending on the cut on final state radiation and on the lepton flavor the contribution from excited states of the B meson can become important.

### Secondary track

T05 - QCD and Hadronic Physics

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