

Whispers from the Dark Universe - Particles & Fields in the Gravitational Wave Era

CLUSTER OF EXCELLENCE
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WHISPERS FROM THE DARK UNIVERSE – PARTICLES & FIELDS IN THE GRAVITATIONAL WAVE ERA

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

Wednesday 25 September 2024 15:15 (15 minutes)

In this talk I will focus on the study of the leptonic $B^- \rightarrow \ell^- \bar{\nu}_\ell$ 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. In the second part of the talk, I will discuss the EFT description below the confinement scale using a point-like description for the B-meson. 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.

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