Contribution ID: **790** Type: **Parallel**

On Soft Contributions to the B → γ* Form Factors

Friday 11 July 2025 08:50 (20 minutes)

The photoleptonic decay B⟶lvγ*is the simplest low-energy process that probes the substructure of the B meson. For an energetic photon, its amplitude can be accessed within the frame of collinear factorization or QCD factorization (QCDF). The factorization formula depends critically on the light-cone distribution amplitudes (LCDAs) of the B meson. The physical photoleptonic amplitude arises in the q^2 ⟶ 0 limit of the B⟶lvγ* amplitude, where q denotes the photon momentum. The amplitude involving an off-shell photon is relevant to the description of the decay B⟶lvl'l'.

Despite the light-cone dominance, the time-ordered product also receives soft contribution by field configurations with x^2 ⊠ Λ_had^2. These are not accessible within the framework of QCDF, However, an estimate using a light-cone sum rule setup.

In this talk, we will focus on the general off-shell photon case. We will first present the corresponding four form factors in a basis that is free of kinematic singularities. The absence of such kinematic singularities is a formal prerequisite for expressing these form factors through hadronic dispersion relations. Then, we will show that these form factors can actually be expressed in the form of dispersion relation. Finally, once in dispersion relation form, we will revisit the derivation of the original light-cone sum rule setup for the general off-shell case to obtain the soft corrections to the form factors.

Secondary track

T05 - QCD and Hadronic Physics

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Session Classification: T07 (Flavour Physics and CP Violation)

Track Classification: T07 - Flavour Physics and CP Violation