

Beyond the Operator Product Expansion: Concepts and Applications of Soft-Collinear Effective Theory

MATTHIAS NEUBERT

*Newman Laboratory for Elementary-Particle Physics, Cornell University
Ithaca, NY 14853, U.S.A.*

Abstract

The recent proposal of a “soft-collinear effective theory” (SCET) for the strong interactions of collinear and soft partons has been an important step toward understanding the factorization properties of hard exclusive processes in QCD and developing a theory of power corrections for observables that do not admit a local operator product expansion. In these lectures I will introduce the formulation of this theory applicable to exclusive B -meson decays into light final-state particles. As an application, I will discuss QCD factorization and Sudakov resummation for the radiative semileptonic process $B \rightarrow \gamma l \nu$. I will also outline the application of SCET to more complicated decays such as $B \rightarrow K^* \gamma$ and $B \rightarrow \pi \pi$, which are of great importance to the physics program at the B factories.