technische universität dortmund

SEMINAR PARTICLE PHYSICS

Topic

Probing the B+ and Bc+ meson substructure with the LHCb experiment

Abstract

Precision measurements of B meson decays provide powerful tests of the Standard Model and sensitive probes for physics beyond it. Their interpretation, however, often relies on the ability to calculate the underlying non-perturbative QCD effects. Thus, a detailed understanding of hadronic structure is essential for fully exploiting the precision of experimental measurements.

The $B^+ \to \mu^+ \nu_\mu \gamma$ decay is often considered the golden mode to probe the internal structure of the B^+ meson. Its decay rate is sensitive to the B-meson light-cone distribution amplitude, and in particular to its first inverse moment, λ_B, which is the most important parameter for exclusive B-meson decay. While it is extremely difficult to obtain the value of λ_B from theoretical models, experimental input on the $B^+ \to \mu^+ \nu_\mu \gamma$ branching fraction is crucial to constrain the value of λ_B and thus reduce the theoretical uncertainty on a wide range of B meson decays. In this context, I will present the search for radiative leptonic $B^{+(c)} \to \mu^+ \nu_\mu \gamma$ decays with the LHCb experiment, the first of its kind at a hadron collider, discuss its impact on the current understanding of the B^+-meson substructure and future prospects of the analysis.

For the doubly-heavy B^+_c meson, composed of a bottom and charm quark, two-body non-leptonic decays offer a complementary laboratory for studying the non-perturbative QCD description of the B^+_c meson. I will present the first search for the Cabibbo-suppressed $B^+_c \to J/\psi\, D^{*+}$ decay and discuss its potential to probe the validity and limitations of factorisation-based models.

Speaker

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Room

CP-03-123

Date and Time

Thursday, 03.09.2026
15:30 – 16:30