

Measurement of the differential distributions of $B_s^0 \rightarrow D_s^{*-} \mu^+ \nu_\mu$ decay with the LHCb detector

Friday, 13 June 2025 10:10 (40 minutes)

This analysis aims to conduct a comprehensive study of the decay kinematics of the semileptonic decay \signal, with $D_s^{*-} \rightarrow D_s^- \gamma$ and $D_s^- \rightarrow K^+ K^- \pi^-$, using data collected by the LHCb experiment in Run 2. A first measurement of the form factors describing the B_s^0 meson semileptonic decay is provided, performing a four-dimensional binned fit in the space given by the variables describing the decay kinematics, namely q^2 , $\cos \theta_\ell$, $\cos \theta_d$ and χ . Taking into account the detector acceptance, as well as the reconstruction efficiencies and the resolution effects, the full differential distribution is obtained; then, a fit to this distribution is performed using different parameterisations for the $B_s^0 \rightarrow D_s^*$ transition form factors. Furthermore, the unfolded distributions are compared with the theoretical predictions and the Belle-II experiment results. Finally, a model-independent approach is tested and its compatibility with the model-dependent results is studied.

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Session Classification: Talks