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Measurements of the CKM angle γ from $B^0 \rightarrow DK^+\pi^-$ decays at LHCb

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The angle γ of the Cabibbo-Kobayashi-Maskawa (CKM) Matrix had been until recent the least known parameters in the Standard Model of elementary particle physics and is still far from well known. The golden mode for measuring the angle γ is a decay of $B^+ \rightarrow DK^+$, where D can be either D^0 or \bar{D}^0 and has a final state accessible from both of them so that there is an interference effect between the two paths, which allows to extract the value of γ . One can extend the principle of the measurement to different decay modes to obtain an independent constraint to the angle γ . One such example is the $B^0 \rightarrow DK^+\pi^-$ decay. The information in the Dalitz plot of the three-body B^0 decay gives a larger sensitivity to γ compared to a two-body decay mode. In this analysis, nine different D final states are used with $B^0 \rightarrow DK^+\pi^-$ in order to maximise the sensitivity. Amongst them a mode where the D decays to $K_s^0\pi^+\pi^-$ gives the largest sensitivity and thus is the main pillar of this analysis. We perform a model-independent analysis exploiting binned Dalitz plots for both the B^0 and D decays and aim at $\sigma(\gamma) \sim 5^\circ$ with a dataset taken during the Run 1 and Run 2 operation of the LHCb experiment.

Orateur: SHIMIZU, Yuya ({UNIV PARIS-SACLAY}UMR9012)

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