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A novel unbinned model-independent method to measure the CKM angle γ in $B^{+-} \rightarrow DK^{+-}$ decays with optimised precision

Tuesday, 18 July 2023 15:40 (20 minutes)

We present a novel unbinned method to combine $B \rightarrow DK$ and charm threshold data for the amplitude-model unbiased measurement of the CKM angle γ in cases where the D meson decays to a three-body final state. The new unbinned approach avoids any kind of integration over the D Dalitz plot, to make optimal use of the available information. We verify the method with simulated signal data where the D decays to $K_S \pi^+ \pi^-$. Using realistic sample sizes, we find that the new method reaches the statistical precision on γ of an unbinned model-dependent fit, i.e. as good as possible and better than the widely used model-independent binned approach, without suffering from biases induced by a mis-modeled D decay amplitude. We expect the method to be useful also in the study of charm mixing and the development of amplitude models, in particular the study of the phase motion across the Dalitz plot. See arXiv:2305.10787.

Consent

I consent to recording/broadcasting my presentation.

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