BESIII Charm Meeting Measurement of CP even fraction F_+ in $D^0 \to K^+K^-\pi^+\pi^-$

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BESIII Charm Meeting 15th March 2022



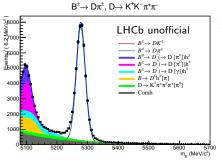


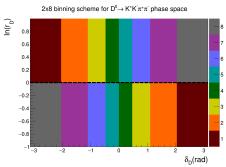
Outline

- Introduction and motivation
- Theory of strong phase analysis
- Selection and tag modes
- 4 Determination of single and double tag yields
- Initial look at K_i
- $\mathbf{6}$ F_+ measurement with CP tags
- 7 F_+ measurement with $K_{S,L}\pi^+\pi^-$ tags
- Summary and conclusion

Introduction

- Original plan (for my PhD):
 - c_i/s_i analysis with new 20 fb⁻¹ BESIII $\psi(3770)$ dataset
 - Develop binning scheme using LHCb model JHEP 02 (2019) 126
 - ullet Perform model independent γ measurement at LHCb simultaneously
 - ullet Expected precision $\Delta\gamma pprox 12^\circ$ with LHCb Run 1+2





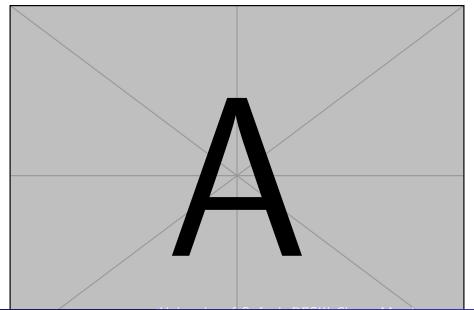
- (a) Fit of $B^{\pm} \rightarrow [K^+K^-\pi^+\pi^-]_D\pi^{\pm}$
- **(b)** Binning scheme for $D^0 o K^+K^-\pi^+\pi^-$

Motivation

- ullet CP even fraction F_+ describes the CP content of a self-conjugate multi-body decay
 - $F_+ = 1$ (0) for CP even (odd) final states
- F_+ can be measured with current $3 \, \text{fb}^{-1}$ dataset
 - Useful cross check of LHCb amplitude model
 - Allows current analyses to include $KK\pi\pi$ as a GLW mode
- \bullet Important input to quasi-GLW analysis of the CKM angle γ
 - Current GLW modes: KK, $\pi\pi$, $\pi\pi\pi\pi$
 - Small effort to include $KK\pi\pi$ to gain more statistics!
- Other F_+ measurements:
 - $D^0 \to \pi^-\pi^-\pi^+\pi^-$ JHEP 01 (2018) 144
 - $D^0 \to K_S \pi^+ \pi^- \pi^0$ JHEP 01 (2018) 82
 - Both measurements are from CLEO-c, BESIII analyses ongoing

Strategy for c_i/s_i analysis

Selection



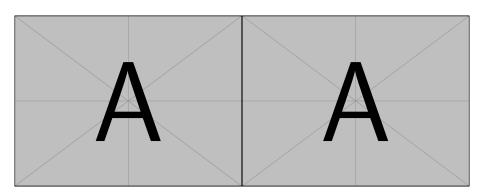
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Tag modes



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Summary

Thank you!