Dalitz plot analyses

Section Editors

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B-factories Legacy Book Meeting  
SLAC, Oct 30-31
Dalitz analysis papers

- Many papers that use Dalitz analysis in some form
- This is a «Tools» section: the papers will illustrate various analysis approaches, all of them will be reviewed in the physics sections

- PRD: 14 (BaBar) + 13 (Belle)
- PRL: 3 (BaBar) + 6 (Belle)
- PLB: 3 (Belle)

(preliminary numbers, probably incomplete)
BaBar Papers

1. Measurement of gamma in B-+ ---> D(*) K+ decays with a Dalitz analysis of D ---> K0(s) pi- pi+

2. Improved measurement of the CKM angle gamma in B-+ ---> D(*) K(*)+ K- decays with a Dalitz plot analysis of D
decays to K0(S) pi+ pi-) and K0(S) K+ K-

3. Dalitz plot analysis of D0 ---> anti-K0 K+ K-

4. Amplitude analysis of the decay D0 ---> K+ K- pi0

5. Dalitz Plot Analysis of D(s)+ ---> pi+ pi- pi+

6. Dalitz Plot Analysis of the Decay B0(anti-B0) ---> K+ pi+ pi0

7. An Amplitude analysis of the decay B+- ---> pi+- pi+- pi+

8. Dalitz-plot analysis of the decays B+- ---> pi+- pi+- pi-

9. Dalitz plot analysis of the decay B+- ---> K+- K+- K-+
    Accepted by Physical Review D arXiv:0905.3615

10. Time-dependent amplitude analysis of B0 ---> K0(S) pi+ pi-

11. Evidence for Direct CP Violation from Dalitz-plot analysis of B+- ---> K+ pi+- pi+

12. Measurements of CP-violating asymmetries in the decay B0 ---> K+ K- K0

13. Measurement of CP-violating asymmetries in B0 ---> (rho pi)0 using a time-dependent Dalitz plot analysis

14. Dalitz Plot Analysis of B+- ---> pi+-pi+-pi-+ Decays

15. Time-dependent Dalitz plot analysis of B0 ---> D+ K0 Pi- decays

16. Dalitz Plot Analysis of B- ---> D+ pi- pi-

17. Measurement of CP Violation Parameters with a Dalitz Plot Analysis of B+- ---> D(pi+ pi- pi0) K+
Belle Papers

3. Study of B0bar -> D(*)0 pi+ pi- Decays. A.Satpathy, et al. PLB 553, 159 (2003), hep-ex/0211022
11. Measurement of the Quark Mixing Parameter cos2phi1 Using Time-Dependent Dalitz Analysis of B0bar -> D[Ks pi+ pi-] h0. P.Krokovny et al. PRL 97, 081801 (2006), hep-ex/0605023
12. Dalitz Analysis of Three-body Charmless B0->K0pi+pi- Decay. A. Garmash et al. PRD 75, 012006 (2007), hep-ex/0610081
13. Study of decay mechanisms in B- -> Lambda_c+ pbar pi- decay and observation of anomalous structure in the (Lambda_c+ pbar) system. N.Gabysev et al. PRL 97, 242001 (2006), hep-ex/0409005
18. Measurement of CP asymmetries and branching fractions in a time-dependent Dalitz analysis of B0 --> (rho pi)0 and a constraint on the quark mixing angle phi2. A. Kusaka, C.-C. Wang et al. PRD 77, 072001 (2008)
Section subdivision

• Introductory part
  • Concept of a DP, the general ideas behind DP fits.
  • Physics motivations behind DP analyses: searches for new states, measuring resonance properties, CP violation, B and D mixing, resolving ambiguities.

• Formalisms - isobar, K matrix.
  • Lineshapes, angular terms, barrier factors.
  • Different ways of parameterising the complex coefficients.

• Extensions:
  • Square Dalitz plot (various forms).
  • Time-dependence.
  • Non-scalar particles in the final state.

• Effects of efficiency, backgrounds, self cross feed, resolution.

  • Technical issues
    Binned vs unbinned fits, approaches for normalisation, adaptive binning, nonparametric backgrounds.

Approximate expected # pages needed for whole section: ~ 20
Inter-correlation

- Physics sections that contain Dalitz analysis results:
  - Charmed and charmless B decays
  - Charm decays
  - Charmonia
  - D mixing
  - CKM angles

- Relies on the following Tools sections:
  - Maximum likelihood fits
  - Unbinned fits
Contributors (preliminary)

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Unconfirmed yet (except A. Palano).