Mixing and Time Dependent analysis

Section Editors

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Belle: ? TBD ?
Theory: ?

Note: These are initial thoughts on how this complicated section fits into the book. Comments / discussions are required to understand how we best optimize fitting this section in with everything else, and as soon as there is a Belle co-section editor, then we will review everything in light of that new input.

Papers: Technique / parameters

BaBar Published:

 - nothing specific: long s2b PRD + more modern publications:
• Phys.Rev.D **79** 072009, 2009 [BaBar final tagging/dilution/Q #s]
• Phys.Rev.D66:032003,2002 [BaBar resolution fn.]

Belle Published:

 - nice paper on the Belle resolution function [have a copy somewhere in my office... need to find].
 - As with BaBar, the rest of the details are briefly scattered through publications...

Other:

 - physical parameters taken from PDG 2012: Δm, τ_B at the last minute
 - many theory papers/lecture proceedings/books out there to help.
• Phys.Rev.D68:034010,2003 [Tag side interference]

Section subdivision

- Mixing [1-2pages]

- Time dependent evolution [1-2 pages]
  - Forward reference to a new CKM section to say what we are trying to measure with this.

- Use of tagging [2 pages]
  - Dilution
  - Tag side interference

- Detector effects: [2 pages]
  - Resolution function

- Parameter extraction from data: [2pages]
  - BFlav fitting for resolution, dilution, tagging performance.

Approximate expected # pages needed for whole section: 8-10pages

Inter-correlations

- Dependency on:
  - Tagging
  - Detectors ($\Delta t/z$ resolution etc).

- Related to (depended on by):
  - B mixing
  - D mixing
  - CPT
  - EPR
  - angles / global fits

Inter-correlations

- ## Mixing sub-section:
  - Neutral meson mixing formalism has a common base, and usage diverges between D and B mixing.

  - B Mixing
  - D Mixing
  - EPR
  - CPT

  - Questions: Do we include z for CPT violation in this section, or does that modification just go into the CPT section? Assume the latter.

Inter-correlations

- Time dependent evolution sub-section:
  - Formalism required for a number of sections: $\alpha + \beta$.

  - forward reference to CKM section.
  - Φ_2 or α
  - Φ_1 or β
  - angular analysis
  - Dalitz
  - Global fits (S, C notation)

  - Don't go into the specifics of the angular analysis, and Dalitz. Those will appear in the angular and Dalitz sections.

Inter-correlations

- Use of tagging
  - Dilution
  - Tag side interference

    – Tagging section.
      - This sub-section will rely heavily on what has been written before for the tagging section. Need to understand how much/little information needs to go in here to describe how tagging is used in a TDCPV measurement.

    – Tag side interference is something that affects S and C, so I think that this is the most natural place to discuss this ahead of the angles sections.

Inter-correlations

- Detector effects:

  - Resolution function

    – Related to B reconstruction / tagging / angles

Inter-correlations

- Parameter extraction from data

    – Related to B reconstruction / tagging / angles

Contributors

Confirmed (beside section editors)

BaBar: ?

Belle: ?

Un-confirmed

BaBar: ?

Belle: ?

Comments