RESEARCH PROGRESS

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(12th May 2004)

OUTLINE

1. **Plan of Action for Analysis**
   - **a)Sensitivity study of $D^0 \to K_L{}^0\pi^0$**
   - **b)Sensitivity study of $D^0 \to K_S{}^0\pi^0$**
   - **c)Systematics in K_L^0 reconstruction, counting and fitting**
2. **Error in analysis and rectification**
3. **GIM mechanism**

Sensitivity study of $D^0 \to {K_L}^0\pi^0$

- Generate signal Monte Carlo for $D^0 \to {K_L}^0\pi^0$
- Write reconstruction code for $D^0 \to {K_L}^0\pi^0$
  a)Use D^0 mass constraint to reconstruct ${K_L}^0$
  b)Tag by $D^{*+} \to D^0{\pi^+}_{slow}$
  c)Count in bins of momentum, polar angle, ΔM
- Skim data
- Analyse data for number of events

Sensitivity study of $D^0 \to {K_S}^0\pi^0$

- Generate signal Monte Carlo for $D^0 \to {K_S}^0\pi^0$
- Write reconstruction code for $D^0 \to {K_S}^0\pi^0$
  a)Reconstruct ${K_S}^0$ by the regular way
  b)Tag by $D^{*+} \to D^0{\pi^+}_{slow}$
  c)Count in bins of momentum, polar angle, ΔM
- Skim data
- Analyse data for number of events

Systematics in $K_L{}^0$ reconstruction, counting and fitting

- Reconstruction efficiency in data and Monte Carlo for
  - a) $D^0 \to K^{*-}\pi^+$, $K^{*-} \to K_L{}^0\pi^-$
    - Reconstruct by D^0 mass constraint method
  - b) $D^0 \to K^{*-}\pi^+$, $K^{*-} \to K_S{}^0\pi^-$
    - Reconstruct by constraining D^0 mass(pseudo$K_L{}^0$)
    - Reconstruct by regular method
- Study systematics of counting and fitting

Error in Calibration Analysis and Rectification

- There was a mathematical error in using D^0 mass constraint
- Has been corrected for the ${K_L}^0$ reconstruction.

GIM Mechanism

- Brief explanation of GIM mechanism