

BESIII Oxford Group Meeting

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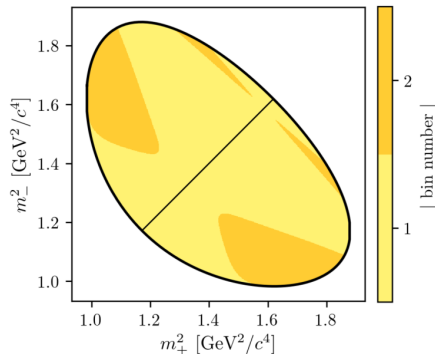
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- $K_{S,L}KK$ double tag yields for $\delta_D^{K\pi}$ measurement
- Procedure:
 - 1 Select $K_{S,L}KK$ events tagged with $K\pi$, $K\pi\pi^0$, $K\pi\pi\pi$ (and $K\nu$)
 - 2 Use $K\pi$ tag to find double tag yield Y_i
 - 3 Use the other tags to find K_i
 - 4 Fit for $r_D^{K\pi} \cos(\delta_D^{K\pi})$ and $r_D^{K\pi} \sin(\delta_D^{K\pi})$

- I've mostly followed the selection from $K_S KK$
- ΔE cuts taken from $K_S KK$ MEMO, except for $K\pi\pi\pi$
- Question: Is K_S veto/flight significance cut needed for $K\pi\pi\pi$?

Binning scheme



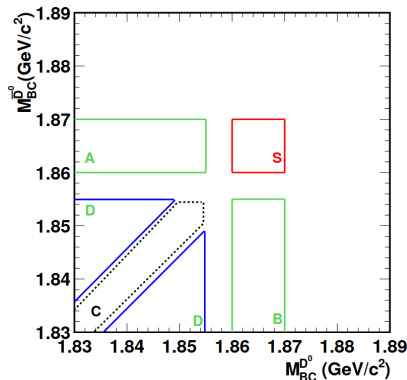
- Generated events outside phase space?
- Reconstructed events outside phase space, should I ignore?

- Bin migration for $K_S K K$ vs $K \pi$:

Generated/Reconstructed	1	2	-1	-2
1	5233	194	69	0
2	298	4087	0	0
-1	68	0	4998	215
-2	0	0	217	2782

- Question: Do I need any m_{BC} requirements when constructing this matrix?

Sideband background subtraction method



$$B = \frac{a_S}{a_D} Y_D + \sum_{i=A,B,C} \frac{a_S}{a_i} \left(Y_i - \frac{a_i}{a_D} Y_D \right)$$

Question: How do I calculate errors (low number statistics)?

$K\pi$ double tag yield results

- Bin efficiency:

- 1 Count number of generated events in each bin
- 2 Count number of truth matched events in each bin after full selection (including sideband subtraction)

Bin	1	2	-1	-2
Yield in signal region	89	72	94	69
Sideband subtracted yield	88.4	71.4	94.0	69.0
Bin migration corrected	89.0	70.1	95.2	67.0
Bin efficiency	9.3%	7.8%	9.7%	7.3%
Final double tag yield	0.255	0.240	0.261	0.245

- Question: Do I use \sqrt{N} for signal MC yield errors?

$K\pi\pi^0$ and $K\pi\pi\pi$ double tag yield results

Bin	1	2	-1	-2
Bin migration corrected ($K\pi\pi^0$)	154.6	96.4	201.7	131.7
Bin efficiency ($K\pi\pi^0$)	3.8%	2.9%	3.7%	3.0%
Bin migration corrected ($K\pi\pi\pi$)	120.6	64.0	139.0	86.1
Bin efficiency ($K\pi\pi\pi$)	7.2%	5.8%	7.2%	5.6%
Final double tag yield (K_i)	0.277	0.161	0.343	0.219

Next steps

- Tuple for $K_S KK$ vs $Ke\nu$ ready, combine with $K\pi\pi^0$ and $K\pi\pi\pi$
- Study peaking backgrounds in inclusive MC
- Repeat with $K_L KK$