

Study of $\Upsilon(1, 2S) \rightarrow \Lambda\phi + X$ decay at Belle

Group meeting

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April 10th, 2026

① Data samples and MC simulation

② Selection Criteria

③ Results

Preliminary Selection

$$\Upsilon(1, 2S) \rightarrow \Lambda[\rightarrow p^+ \pi^-] \phi[\rightarrow K^+ K^-] + \text{any}...$$

Data samples

- A 5 fb data sample collected at $\Upsilon(1S)$
peak $\sqrt{s} = 9.46$ GeV.
- A 25 fb data sample collected at $\Upsilon(2S)$
peak $\sqrt{s} = 10.02$ GeV.

MC simulation

- 2×10^5 signalMC events

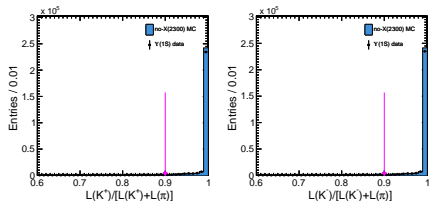
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Selection Criteria

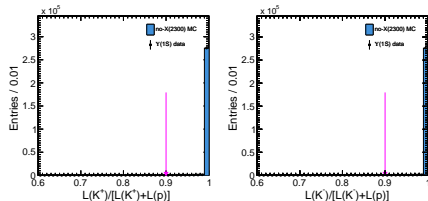
- PID selection
 - $\frac{\mathcal{L}(K^\pm)}{\mathcal{L}(K^\pm)+\mathcal{L}(\pi^\pm)} > 0.9$ and $\frac{\mathcal{L}(K^\pm)}{\mathcal{L}(K^\pm)+\mathcal{L}(p)} > 0.9$
- Track selection
 - $dr < 0.5$ cm and $|dz| < 2.0$ cm
- Λ MVA selection
 - $\text{ksnbNoLamv} < -0.4$ and $\text{ksnbV0Like} > 0.5$
- Λ mass window
 - $|M(p\pi) - 1.1156| < 0.0016 \times 3.0 \text{ GeV}/c^2$
- ϕ mass window
 - $|M(K^+K^-) - 1.02| < 0.02 \times 3.0 \text{ GeV}/c^2$
- Best candidate selection
 - minimize χ^2 of Λ

$\phi \rightarrow K^+ K^-$ PID & Track selection

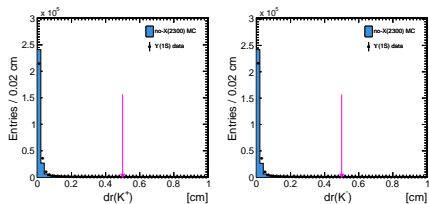
- $\frac{\mathcal{L}(K^\pm)}{\mathcal{L}(K^\pm) + \mathcal{L}(\pi^\pm)} > 0.9$



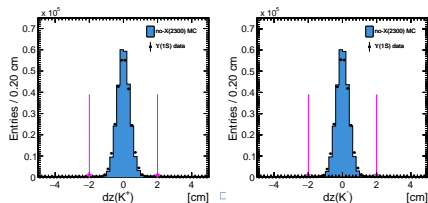
- $\frac{\mathcal{L}(K^\pm)}{\mathcal{L}(K^\pm) + \mathcal{L}(p)} > 0.9$



- $dr < 0.5$ cm

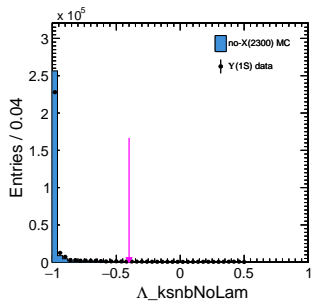


- $|dz| < 2.0$ cm

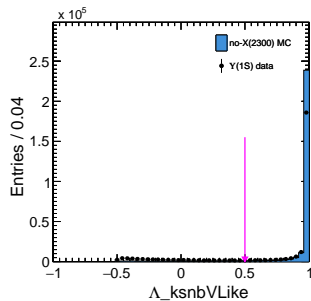


Λ MVA selection

- $\text{ksnbNoLamv} < -0.4$

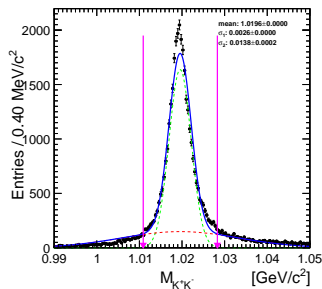
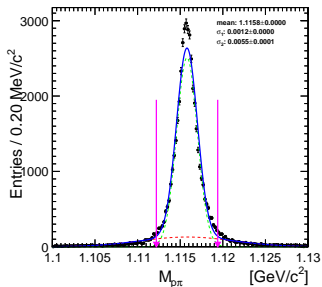


- $\text{ksnbV0Like} > 0.5$



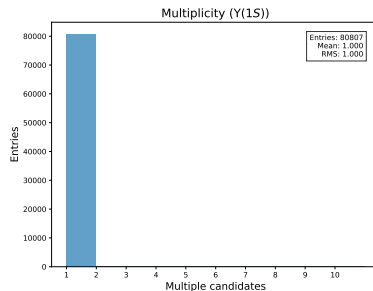
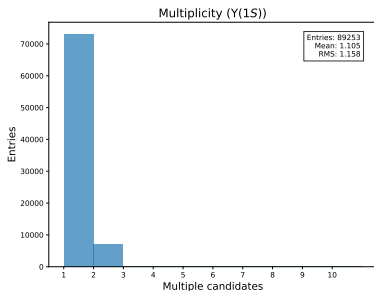
Mass window

- $|M(p\pi) - 1.1156| < 0.0012 \times 3 \text{ GeV}/c^2$
- $|M(K^+ K^-) - 1.0196| < 0.0026 \times 3 \text{ GeV}/c^2$



Best candidate selection

candidate with minimize χ^2 of Λ



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Preliminary results

No obvious P_s signal is observed in the invariant mass distribution of $\Lambda\phi$ system

