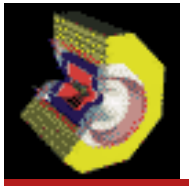

Cornell University
Laboratory for
Elementary-Particle Physics

$D_S^{*+} \to D_S^+ e^+ e^-$

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Contents

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DeltaM and mBC Sidebands – Updated

Mode	$\Delta M < 0.5$ GeV					$\Delta M < 0.3$ GeV				
	ddmix MC	cont MC	tot MC	data	$\frac{\text{data}}{\text{MC}}$	ddmix MC	cont MC	tot MC	data	$\frac{\text{data}}{\text{MC}}$
$K^+K^-\pi^+$	43 ± 1.5	6.2 ± 1.1	49 ± 1.8	97 ± 9.8	2 ± 0.21	4.3 ± 0.46	0.4 ± 0.28	4.7 ± 0.54	9 ± 3	1.9 ± 0.68
K_SK^+	13 ± 0.82	7.2 ± 1.2	21 ± 1.5	28 ± 5.3	1.4 ± 0.27	2.2 ± 0.33	0.8 ± 0.4	3 ± 0.52	4 ± 2	1.3 ± 0.71
$\eta\pi^+$	3.1 ± 0.4	13 ± 1.6	16 ± 1.6	26 ± 5.1	1.6 ± 0.36	0.35 ± 0.13	2.2 ± 0.66	2.6 ± 0.68	4 ± 2	1.6 ± 0.89
$\eta'\pi^+$	2.5 ± 0.35	0.2 ± 0.2	2.7 ± 0.4	3 ± 1.7	1.1 ± 0.68	0.2 ± 0.1	0 ± 0	0.2 ± 0.1	0 ± 0	0
$K^+K^-\pi^+\pi^0$	150 ± 2.73	23.8 ± 2.2	173 ± 3.5	400 ± 20	2.31 ± 0.12	17.1 ± 0.9	3 ± 0.8	20.1 ± 1.2	41 ± 6.4	2.03 ± 0.34
$\pi^+\pi^-\pi^+$	28.6 ± 1.19	72.4 ± 3.8	101 ± 4.0	225 ± 15	2.23 ± 0.17	2.6 ± 0.36	7.8 ± 1.25	10.4 ± 1.3	15 ± 3.87	1.44 ± 0.41
$K^{*+}K^{*0}$	42.8 ± 1.46	4.4 ± 0.94	47.2 ± 1.7	144 ± 12	3.05 ± 0.28	7.1 ± 0.6	0.8 ± 0.4	7.9 ± 0.72	10 ± 3.16	1.27 ± 0.42
$\eta\rho^+$	35.4 ± 1.33	57.6 ± 3.39	93 ± 3.65	128 ± 11.3	1.38 ± 0.133	4.05 ± 0.45	8.2 ± 1.28	12.2 ± 1.36	16 ± 4	1.31 ± 0.357
$\eta'\pi^+$	24.1 ± 1.1	45.6 ± 3.02	69.7 ± 3.21	136 ± 11.7	1.95 ± 0.19	3.05 ± 0.391	6.2 ± 1.11	9.25 ± 1.18	9 ± 3	0.973 ± 0.347

Mode	$m_{BC} < 2.102$ GeV					$m_{BC} > 2.122$ GeV				
	ddmix MC	cont MC	tot MC	data	$\frac{\text{data}}{\text{MC}}$	ddmix MC	cont MC	tot MC	data	$\frac{\text{data}}{\text{MC}}$
$K^+K^-\pi^+$	1.1 ± 0.23	0.4 ± 0.28	1.5 ± 0.36	5 ± 2.2	3.4 ± 1.8	0.5 ± 0.16	0 ± 0	0.5 ± 0.16	2 ± 1.4	4 ± 3.1
K_SK^+	0.8 ± 0.2	1 ± 0.45	1.8 ± 0.49	3 ± 1.7	1.7 ± 1.1	0.2 ± 0.1	0.2 ± 0.2	0.4 ± 0.22	2 ± 1.4	5 ± 4.5
$\eta\pi^+$	0.05 ± 0.05	0.6 ± 0.35	0.65 ± 0.35	2 ± 1.4	3.1 ± 2.7	0.05 ± 0.05	0 ± 0	0.05 ± 0.05	0 ± 0	0
$\eta'\pi^+$	0.2 ± 0.1	0 ± 0	0.2 ± 0.1	0 ± 0	0 ± nan	0.1 ± 0.071	0 ± 0	0.1 ± 0.07	0 ± 0	0
$K^+K^-\pi^+\pi^0$	8.5 ± 0.7	1.8 ± 0.6	10 ± 0.9	8 ± 3	0.78 ± 0.28	3.1 ± 0.4	0.8 ± 0.4	3.9 ± 0.6	7 ± 2.6	1.8 ± 0.7
$\pi^+\pi^-\pi^+$	1.1 ± 0.23	3.6 ± 0.85	4.7 ± 0.88	6 ± 2.4	1.3 ± 0.58	0.5 ± 0.16	0.8 ± 0.4	1.3 ± 0.43	0 ± 0	0
$K^{*+}K^{*0}$	2 ± 0.32	0.2 ± 0.2	2.2 ± 0.38	3 ± 1.7	1.3 ± 0.8	1 ± 0.22	0 ± 0	1 ± 0.22	0 ± 0	0 ± nan
$\eta\rho^+$	1.4 ± 0.26	3.6 ± 0.85	5 ± 0.89	5 ± 2.2	1 ± 0.48	0.7 ± 0.19	2.6 ± 0.72	3.3 ± 0.74	3 ± 1.7	0.91 ± 0.56
$\eta'\pi^+$	1.1 ± 0.24	3.4 ± 0.82	4.5 ± 0.86	2 ± 1.4	0.44 ± 0.32	0.35 ± 0.13	1.4 ± 0.53	1.8 ± 0.55	1 ± 1	0.57 ± 0.6

DeltaM and mBC Sidebands – Updated

Possible Reasons of Discrepancy

1. Electrons of events in the sidebands are very soft and the reconstruction efficiency is not modeled accurately in Generic MC

2. 3 sigma dE/dx is applied as a track quality criterion in my n-tuplizer. We should try taking this out and see if Generic MC matches data any closer. If so, then Generic MC isn't accurately modeling the dE/dx.

- Also looking into Ds mass sideband.

- Am going to reproduce these tables for Dataset48 which has ~ 200 /pb of data.

Signal Region -- Updated

Mode	Generic MC Signal Region	Continuum MC Signal Region	Total MC Signal Region	Data	Signal Expected	Conversions Expected
$K^+K^-\pi^+$	0.55 ± 0.17	0 ± 0	0.55 ± 0.17	3 ± 1.7	4.0	0.23
K_SK^+	0.15 ± 0.09	0.4 ± 0.28	0.55 ± 0.30	0 ± 0	1.1	0.04
$\eta\pi^+$	0.05 ± 0.05	0 ± 0	0.05 ± 0.05	2 ± 1.4	0.5	0.02
$\eta'\pi^+$	0.1 ± 0.07	0 ± 0	0.1 ± 0.07	1 ± 1	0.3	0.008
$K^+K^-\pi^+\pi^0$	1.65 ± 0.29	0.2 ± 0.2	1.85 ± 0.35	4 ± 2	1.7	0.18
$\pi^+\pi^-\pi^+$	0.2 ± 0.1	0.4 ± 0.282843	0.6 ± 0.3	1 ± 1	1.19	0.02
$K^{*+}K^{*0}$	0.35 ± 0.13	0 ± 0	0.35 ± 0.13	1 ± 1	0.64	0.04
$\eta\rho^+$	0.45 ± 0.15	1.4 ± 0.52915	1.85 ± 0.55	2 ± 1.41421	1.6	0.05
$\eta'\pi^+$	0.2 ± 0.1	0.8 ± 0.4	1 ± 0.412311	0 ± 0	0.63	0.06

What are those events in the signal region of the Generic MC?

1. pi0 -> e+ e- gamma (overwhelmingly)
2. Two gamma -> e+ e- in the same event.

Dalitz decay of pion may be beaten by cutting on the invariant mass of the e+ e- and a photon in the event. (Looking into this ASAP)

Is the generic MC modeling the inclusive pion production accurately?

DeltaM and mBC Sidebands – Updated

Possible Reasons of Discrepancy

1. Electrons of events in the sidebands are very soft and the reconstruction efficiency is not modeled accurately in Generic MC

2. 3 sigma dE/dx is applied as a track quality criterion in my n-tuplizer. We should try taking this out and see if Generic MC matches data any closer. If so, then Generic MC isn't accurately modeling the dE/dx.

Reprocessing

Dataset 48 is ~ 50% done.

We estimate it'll take till this weekend to get that done.

Dan has staged in all but 32 out of ~1000 runs of Dataset 47.