

## 2D vs 1D yields

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## Overview

- ▶ Have checked yields for SKrate executable against Leila's to verify correct inputs being used
- ▶ Now comparing yields from SK\_plots2015 obtained with 2D and 1D binning
- ▶ Using Kirsty's branch of CVS with changes added by Leila to do 2D
- ▶ Start by using SK nominal "style 0" which should result in identical yields

## Changes since Leila's numbers last week

### Code

- ▶  $\beta = 1$  now set for  $\nu_\mu$  events (was 0 before in both 1D and 2D)
- ▶ Fixed difference in hardcoded oscillation parameters between 1D and 2D

### Results

- ▶ Unoscillated yields were identical to start with
- ▶ Oscillated  $\nu_\mu$  yields also now identical
  - Binning is the same so this is expected
- ▶ Oscillated  $\nu_e$  yields very similar but small differences

## $\nu_e$ Oscillated - 1D

	$\nu_\mu$	$\nu_e$	$\bar{\nu}_\mu$	$\bar{\nu}_e$	$\nu_e$ signal	$\bar{\nu}_e$ signal
CCQE	0.063	1.988	0.001	0.085	9.321	0.157
CC1 $\pi$	0.013	0.388	0.000	0.027	1.285	0.028
CC coherent	0.000	0.008	0.000	0.006	0.029	0.010
CCn $\pi$	0.001	0.032	0.000	0.003	0.017	0.001
CC other	0.000	0.005	0.000	0.000	0.002	0.000
NC $\pi^0$	0.655	0.015	0.029	0.001	0.000	0.000
NC $\pi^{+/-}$	0.119	0.003	0.005	0.000	0.000	0.000
NC coherent	0.150	0.003	0.018	0.001	0.000	0.000
NC other	0.096	0.004	0.007	0.001	0.000	0.000
2p-2h	0.004	0.380	0.000	0.020	1.390	0.027
NC 1 $\gamma$	0.191	0.003	0.010	0.000	0.000	0.000
<b>Sample totals</b>	1.292	2.828	0.070	0.145	12.044	0.224
<b>Total</b>	16.602					

## $\nu_e$ Oscillated - 2D

	$\nu_\mu$	$\nu_e$	$\bar{\nu}_\mu$	$\bar{\nu}_e$	$\nu_e$ signal	$\bar{\nu}_e$ signal
CCQE	0.063	1.988	0.001	0.085	9.321	0.157
CC1 $\pi$	0.013	0.388	0.000	0.027	1.285	0.028
CC coherent	0.000	0.008	0.000	0.006	0.029	0.010
CCn $\pi$	0.001	0.032	0.000	0.003	0.017	0.001
CC other	0.000	0.005	0.000	0.000	0.002	0.000
NC $\pi^0$	0.655	0.015	0.029	0.001	0.000	0.000
NC $\pi^{+/-}$	0.119	0.003	0.005	0.000	0.000	0.000
NC coherent	0.150	0.003	0.018	0.001	0.000	0.000
NC other	0.096	0.004	0.007	0.001	0.000	0.000
2p-2h	0.004	0.380	0.000	0.020	1.390	0.027
NC 1 $\gamma$	0.054	0.003	0.005	0.000	0.006	0.000
<b>Sample totals</b>	1.154	2.828	0.066	0.145	12.049	0.224
<b>Total</b>	16.466					

- ▶ Yields now acceptably similar
- ▶ Remaining  $\nu_e$  oscillated difference is all in NC  $1\gamma$ 
  - will investigate further
- ▶ Will now move on to applying 2D splines from Raj then, investigate binning using my splines