

Check of non-prompt neutrino generation II

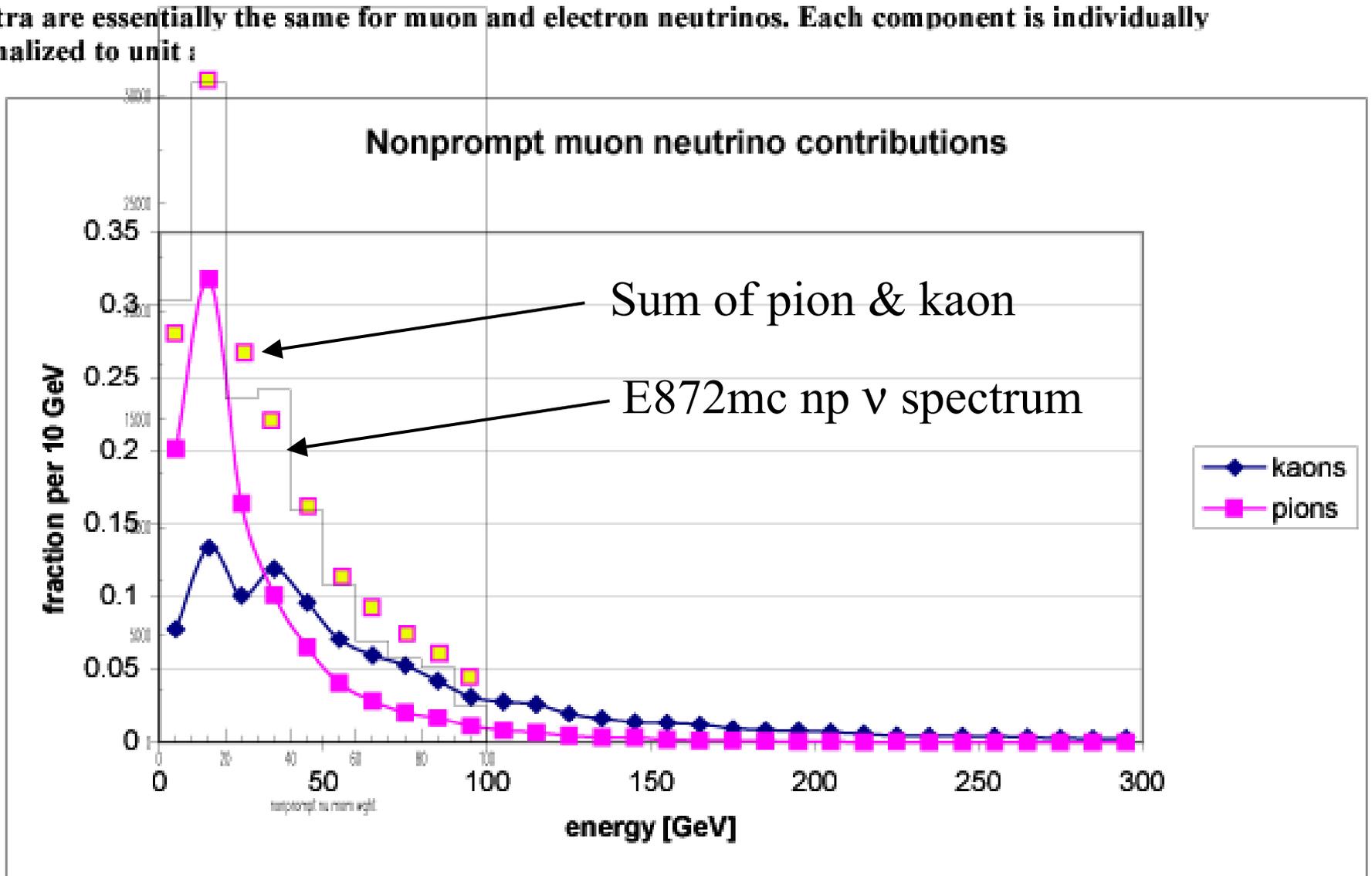
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Oct 16, 2003

Chat w Patrick

- Differences between e872mc generated non-prompt ν and μ spectra and Patrick's thesis due to binning
- First bin in ν spectrum (next slide) is due to 5 GeV cut

spectra are essentially the same for muon and electron neutrinos. Each component is individually normalized to unit :



Check μ spectrum

- Generated 1k non-prompt $CC\mu$ events with m-files
- Reconstructed and located events
- Tagged muons
- Next slide compares muon momentum distribution with p 90 of Patricks' thesis using his binning
- First “data point” is explicitly 0 due to 5 GeV momentum cut
- Second data point range (2.5 GeV - 7.5 GeV) spans the momentum cut

Muon momentum distributions (MC)

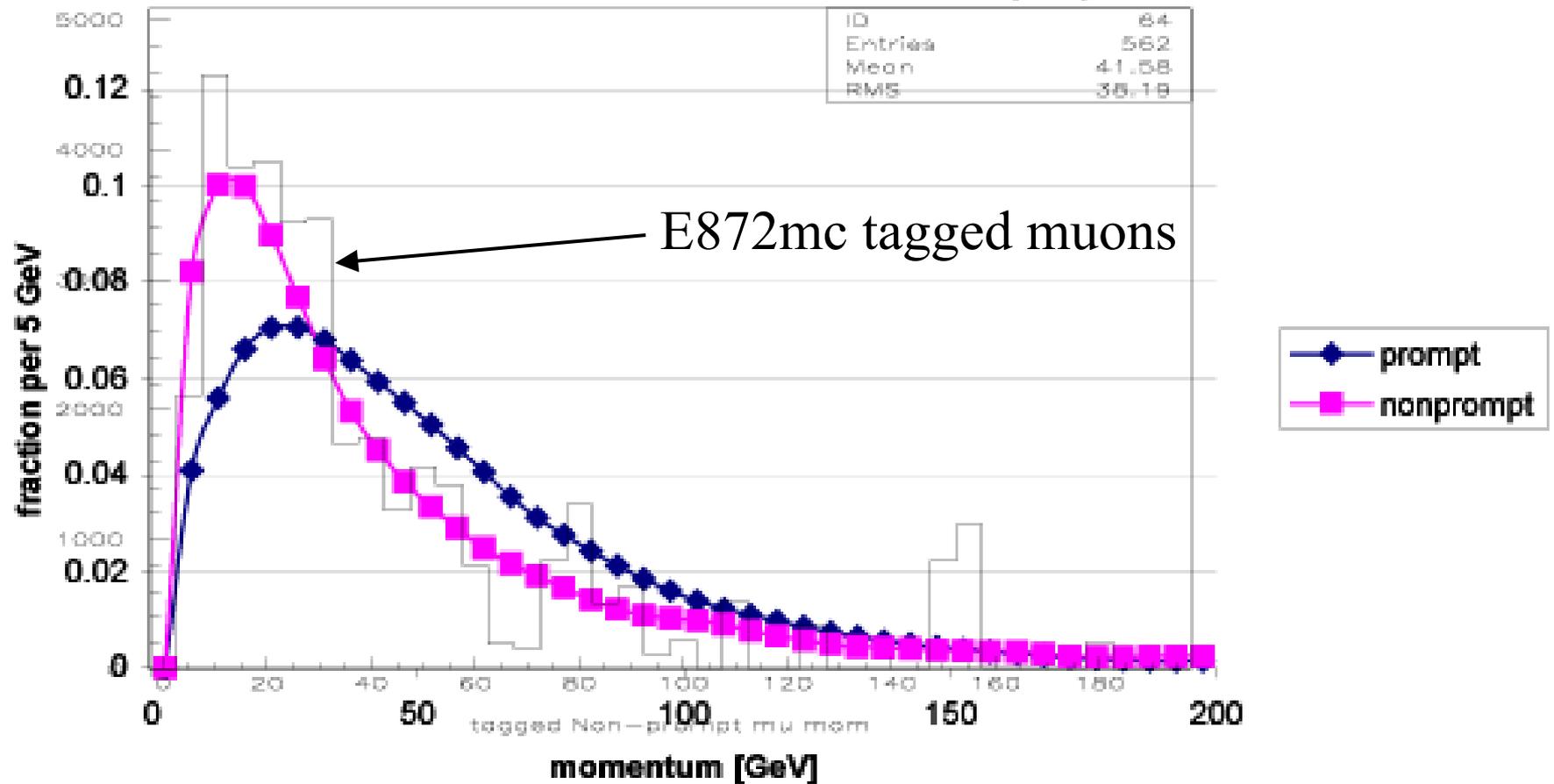


Figure 6-1: Monte Carlo momentum distributions for prompt and nonprompt muons. Both distributions are normalized to unit area.

Non-Prompt Normalization

- Some confusion about the np fraction
 - 49% (prompt/total) is the “raw” fraction from a fit to the momentum spectrum (Patrick’s Thesis Table 6-3)
 - After correcting for MID efficiency (71% p, 56% np) the fraction is 41% (P. Thesis Table 6-6)
 - I get slightly different numbers when checking numbers from Patrick’s thesis (See highlighted cells in next slide)
 - The correct number for e872mc input should also correct for the trigger and stripping efficiency (75% p, 55% np)
 - Get an anomalously low prompt/total fraction = 35%

	Nnu/PO T 10 ⁻⁵	<E _{nu} >	Trigger Eff	Strip Eff	Mu Mom > 5 GeV	MID wall Acc	Overall Eff	# Interact/ POT 10 ⁻⁵	Exp Frac of Interact	# Trig,strip,MI D evts/ POT 10 ⁻⁵	Exp Frac of Evs	# Trig,strip evts/ POT 10 ⁻⁵	MID Effic
Prompt numu							55%	187		102		140	73%
Prim Charm	3	56	94.7%	80.0%	98.8%	73.5%	55%	168	90.0%	92	90.6%	127	73%
Lambda C	0.15	81	96.5%	81.0%	99.0%	79.7%	62%	12	6.5%	7	7.3%	9	79%
Sec charm	0.2	33	67.6%	78.0%	98.9%	62.5%	33%	7	3.5%	2	2.1%	3	62%
Non-Prompt numu							30%	175		52		102	51%
pions	6.9	15.3	74.6%	75.0%	94.8%	46.2%	25%	106	60.3%	26	49.3%	59	44%
kaons	2.6	26.7	78.7%	79.0%	97.9%	63.0%	38%	69	39.7%	27	50.7%	43	62%
							prom/total	52%	prom/total	66%			
	weights	Fraction	MID Acc										
1k MC non-prmp	11423												
Triggered	10439	91.4%											
Located	9786	85.7%											
>3 MID hits	3930	34.4%	40%	<< Ignore MID prop tubes, no 5 GeV cutoff									
PB prom/total raw	49%												
PB prom/total cor	40%	Corrected for MID and muon cut = table 6.6											
PB prom/total inter	35%	Corrected for overall efficiency = mymc.ctf input											