

Final(?) Parameter Analysis Results

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I performed the final(?) parameter analysis on the nine tau candidates.

There are some differences from what I have done in the past:

- Different Prior Probabilities
- Different Material Types
(Iron, Emulsion, or Plastic)

I will explain each difference.

Prior Probabilities

In the past, I used Jason's prior probabilities for the candidates: 3024_30175, 3039_01910, and 3333_17665.

Jason's priors were calculated taking into account specific event traits.

For consistency, I will use the more general prior probabilities which I calculated. The details are in my thesis.

Prior Probabilities Cont.

The prior probabilities I used are listed in the following table, where Tau is the prior for a tau neutrino interaction, Ch is the prior for a Charm background, Fe is the prior for an interaction in the iron, Em for an interaction in the emulsion, and PI for an interaction in the plastic.

Type	Tau	Ch	Fe	Em	PI
Kink	1.6E-2	1.2E-3	5.1E-4	4.1E-5	7.5E-6
Trident	2.7E-3	1.9E-3	3.6E-4	1.3E-5	3.9E-6
Short	2.2E-3	7.0E-4	2.8E-3	—	—

Material Type

For some events, I did not know the material type. For my initial analysis, I assumed these were in iron. Here are the correct materials, which I used for this analysis:

Event	Material
3024_18706	iron
3024_30175	plastic
3039_01910	plastic
3139_22722	iron
3140_22143	emulsion
3250_01713	plastic
3296_18816	emulsion
3333_17665	plastic
3334_19920	plastic

Final Results:

Event	$P(\tau)$	$P(c)$	$P(\text{int})$	
3024_18706	100	0	0	k, Fe
3024_30175	53	47	0	k, PI
3039_01910	96	4	0	k, PI
3139_22722	65	25	10	s, Fe
3140_22143	97	3	0	k, Em
3250_01713	87	12	1	tri, PI
3296_18816	71	29	0	tri, Em
3333_17665	98	2	0	k, PI
3334_19920	100	0	0	tri, PI

Old Results:

Event	$P(\tau)$	$P(c)$	$P(\text{int})$
3024_30175	64	36	0
3250_01713	71	3	26
3333_17665	99	1	0

3024_30175 and 3333_17665 changed because I used difference priors.

3250_01713 changed because I assumed it was in iron, but it is in plastic.