Four Parameter Analysis on the Trident Events
Emily Maher
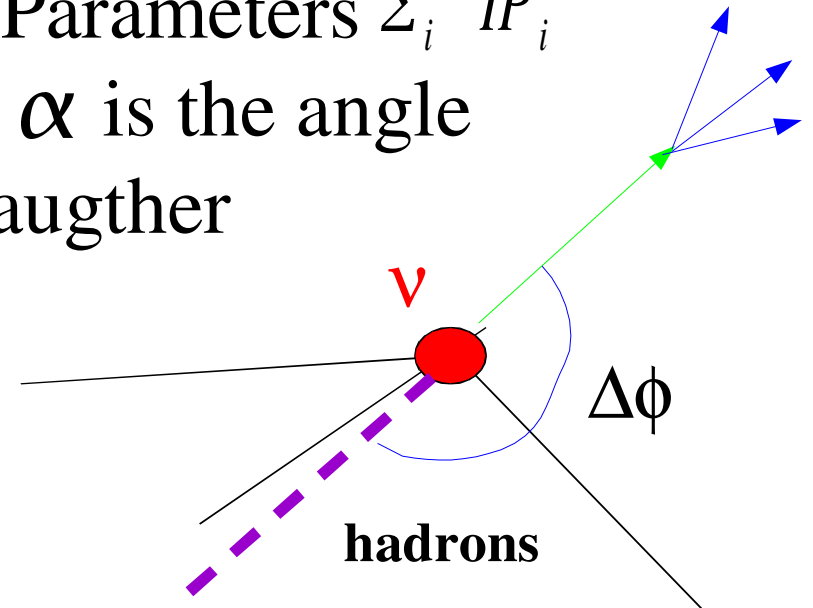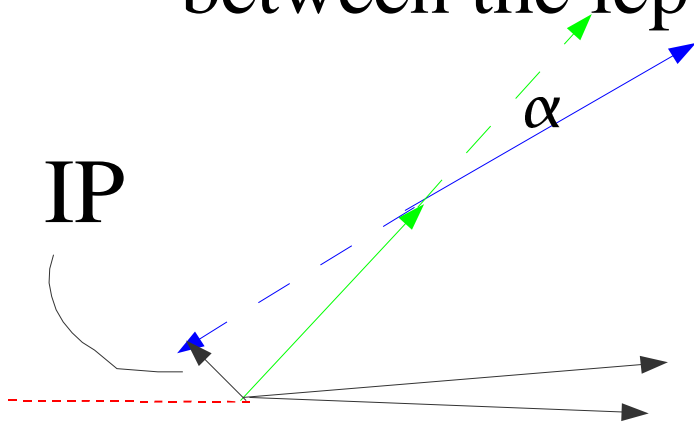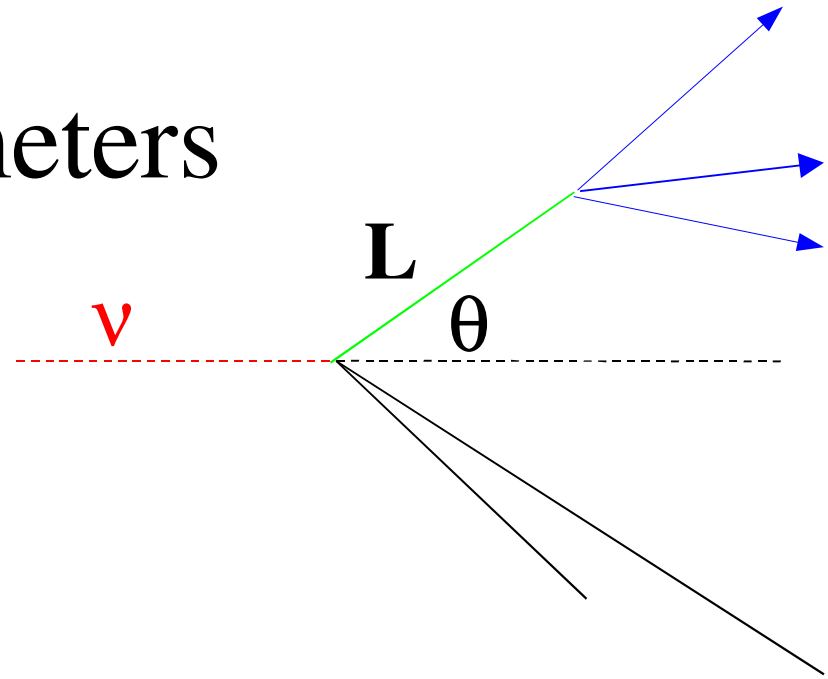## DONuT Collaboration Mtg.
August 8-11, 2003
Fermi National Accelerator Laboratoy

Parameters

- Production Angle θ

- Angular Symmetry $\Delta\phi$

- Decay Length L

- Sum of the Daughter Impact Parameters $\Sigma_i \; IP_i$ $i=1,2,3,$ $IP = L\sin\alpha$ where α is the angle between the lepton and the daugther

ν

L

θ

α

IP

ν

$\Delta\phi$

hadrons

Old vs. New Data Sets

Number of Simulated Events

Old Data Set

- Tau – 470,963

- Charm – 391,986

- Interactions – 445,700

New Data Set

- Tau – 15,001

- Charm – 31,543

- Interactions – 7,027

Distributions similar for all 3 parameters

Three Parameter Result

(as a check)

Old Data Sets

Event	Tau	Charm	Int.
3334_19920	0.96	0.03	0.01
3296_18816	0.89	0.01	0.10

New Data Sets

Event	Tau	Charm	Int.
3334_19920	0.94	0.06	0.00
3296_18816	0.00	0.00	0.00

Not enough events in 3-D volume, so I must open the volume...

Opening the Volume of Parameter Space

3 Parameter Results

Event	Tau	Charm	Int.
3334_19920	0.83	0.12	0.05
3296_18816	0.35	0.28	0.37

4 Parameter Results (adding sum of ip)

Event	Tau	Charm	Int.
3334_19920	0.92	0.08	0.00
3296_18816	0.41	0.59	0.00

Lose some of the discriminating power
Sum of the IP does improve analysis

Conclusions and Future Work

- Need more simulated events

- I will simulate more events until I have a number of the order of the old data set

- Sum of the impact parameters of the daughters does improve analysis