

# Larry's PFA and Detector Studies

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# Variations Tested

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- Radius: Acme0605 inner ECAL radius  
125cm, 150cm, 175cm
- Readout: Acme0605 RPC and Steel
- Interaction Material: Acme0605 Steel and  
Tungsten
- HCAL Layering: SiD01 32, 33, 34 and 35  
layers

# Basics

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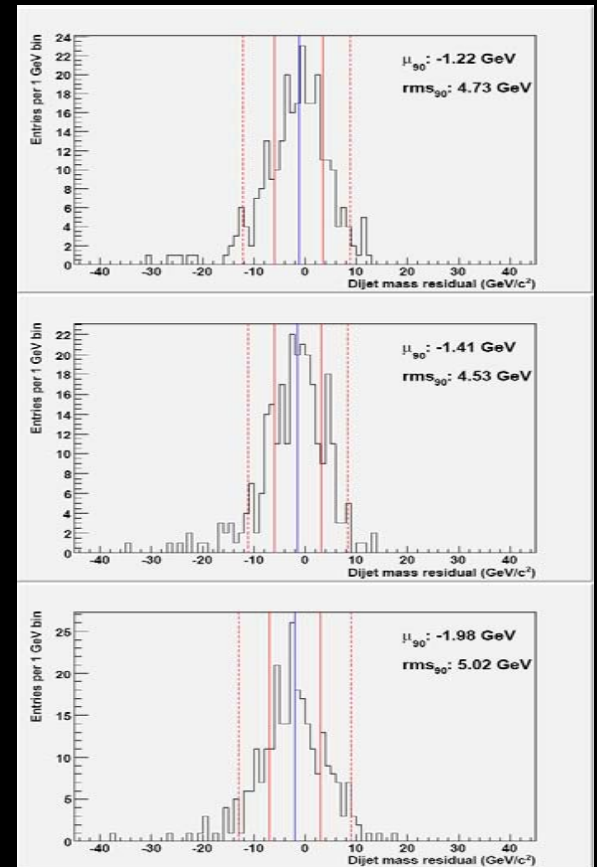
- All events have cut between the initial quarks:

$$|\cos \theta| < .8$$

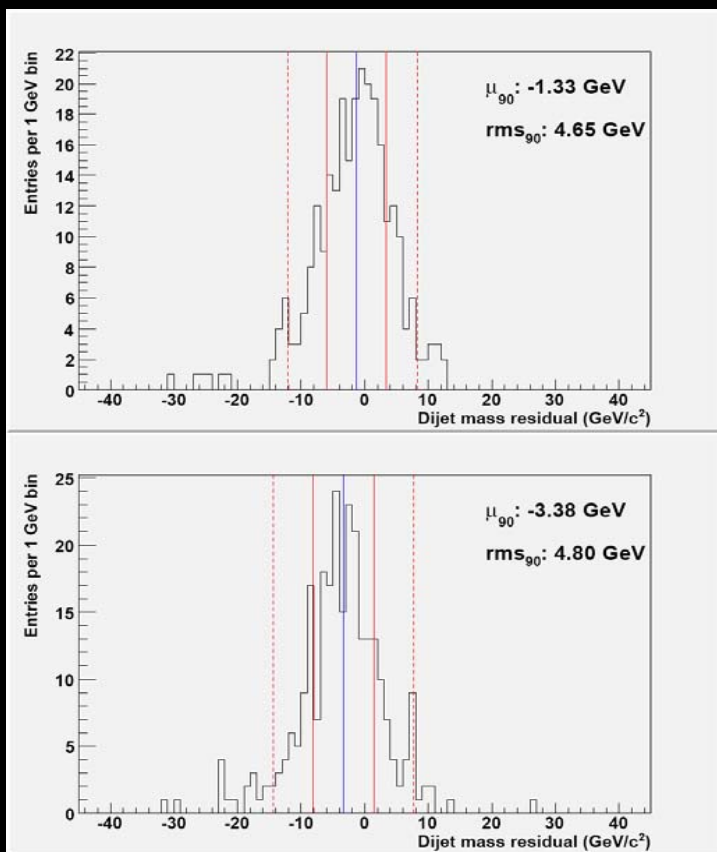
- $M_{\text{mean90}}$ ,  $M_{\text{rms90}}$ ,  $\Delta M/M$

# Varying Radius

Radius (cm)	Mmean90 (GeV)	Mrms90 (GeV)	$\Delta M/M$ (%)
125	-1.22	4.73	5.26
150	-1.41	4.53	5.05
175	-1.98	5.02	5.63



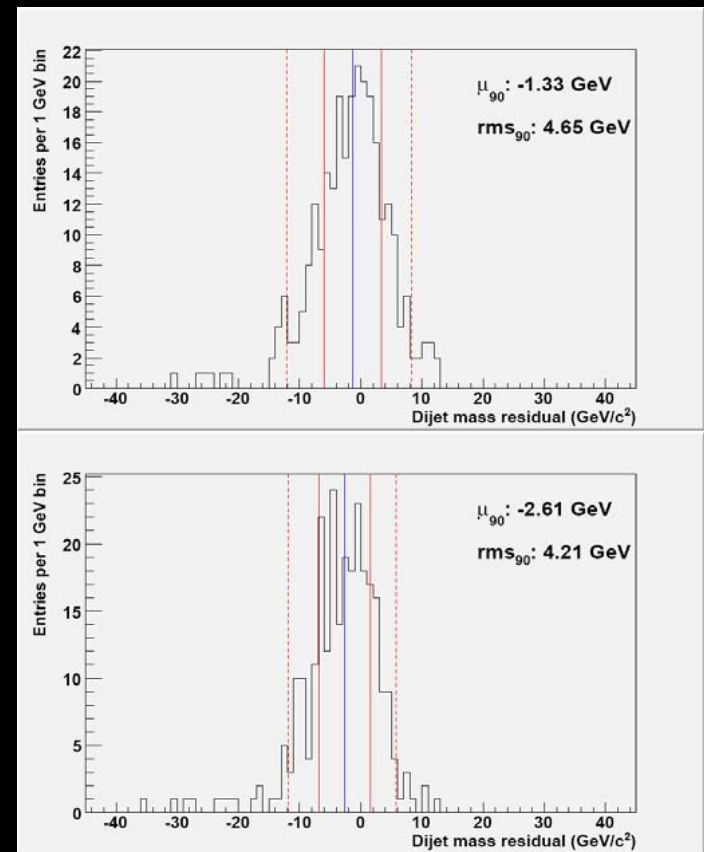
# RPC vs Scint



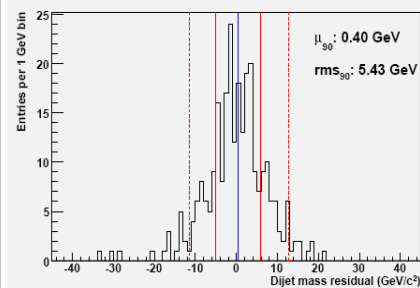
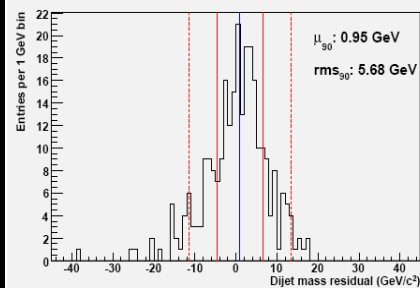
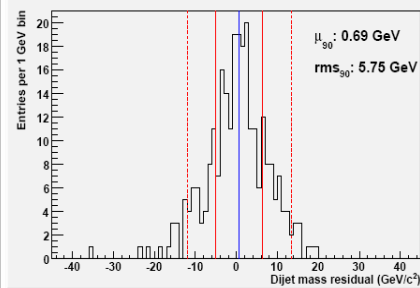
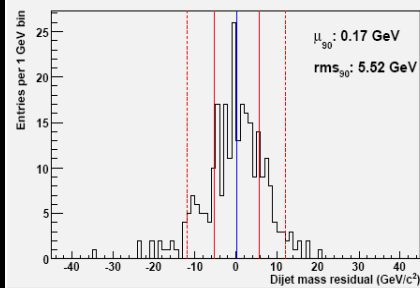
Readout	Mmean90 (GeV)	Mrms90 (GeV)	$\Delta M/M$ (%)
Scintillator	-1.33	4.65	5.17
RPC	-3.38	4.80	5.47

# Steel vs Tungsten

Material	Mmean90 (GeV)	Mrms90 (GeV)	$\Delta M/M$ (%)
Tungsten	-1.33	4.65	5.17
Steel	-2.61	4.21	4.75



# Layering Results



Layers	Mmean90 (GeV)	Mrms90 (GeV)	$\Delta M/M$ (%)
32	.17	5.52	6.04
33	.69	5.75	6.26
34	.95	5.68	6.16
35	.40	5.43	5.93

# Comparison to Ron

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Variation	$\Delta M/M$ (%) Cassell	$\Delta M/M$ (%) Bronk
125 cm radius	4.87	5.26
150 cm radius	4.92	5.05
175 cm radius	4.84	5.63
Sintillator	4.87	5.17
RPC	5.47	5.47
Tungsten	4.87	5.17
Steel	4.79	4.75



# Results

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- Ron had 10x more events
- General results/trends would seem to agree
- Scint > RPC
- Steel > Tungsten
- Radius = ?
- Layering improves resolution

# What's Next

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- Varying B-Field (need stdhep files)
- Even more layers/sampling
- Suggestions?

# The End

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Thanks for all the help SLAC!