SLICPandora Jet Energy Resolution

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From data calculate $\text{rms}_{90}(E_{jj})$ and $\text{mean}_{90}(E_{jj})$

$$\frac{\sigma(E_j)}{E_j} = \frac{\text{rms}_{90}(E_{jj})}{\text{mean}_{90}(E_{jj})}\sqrt{2}$$

$$\Delta\frac{\sigma(E_j)}{E_j} = \frac{\frac{\sigma(E_j)}{E_j}}{\sqrt{N}}$$

Decision between barrel ($\cos(\theta) < 0.7$) and forward region ($0.7 < \cos(\theta) < 0.975$) based on event variable calculated from quark content:

$$\cos(\theta) = \cos(\theta)_{tot}/E_{tot}$$

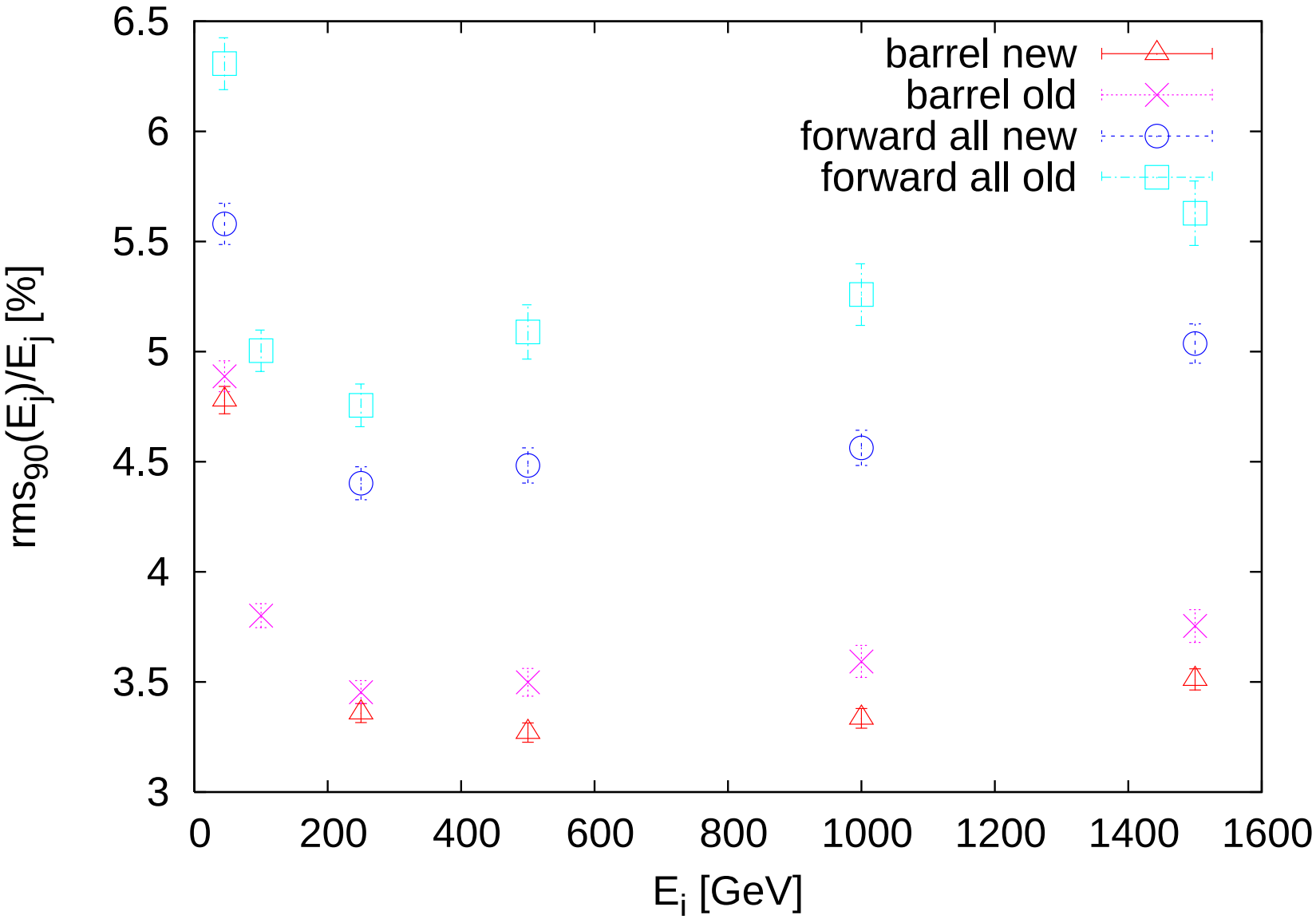
with

$$\cos(\theta)_{tot} = \sum_q \cos(\theta)_q \cdot E_q$$

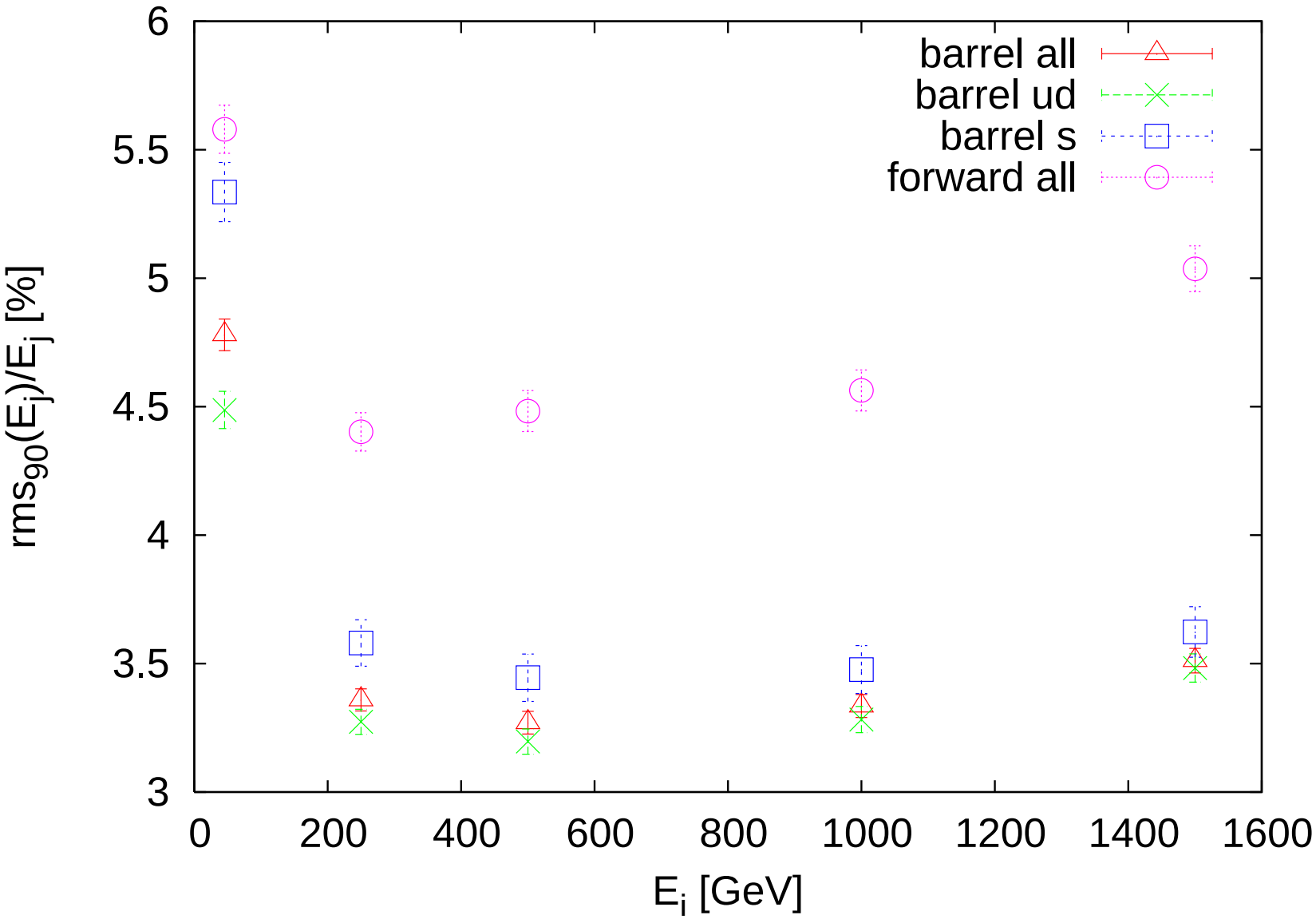
$$\cos(\theta)_q = |p_z|/p$$

and E_{tot} as total energy in event contained in quark content.

Compare old and new version



Updated numbers for SLICv2r9p8



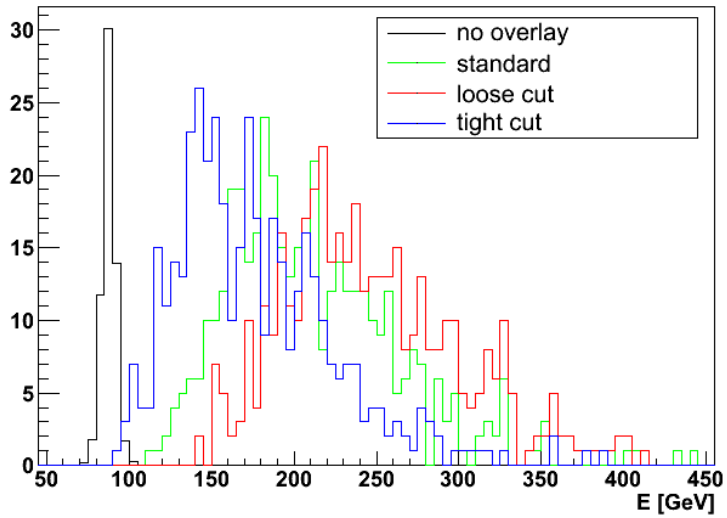
First look at overlay: Timing Cuts

John Marshall looked at PFOSelection based on timing cuts but on signal only, no overlay to see the influence on the signal in this case the jet energy resolution.
Waiting for these samples at the moment.

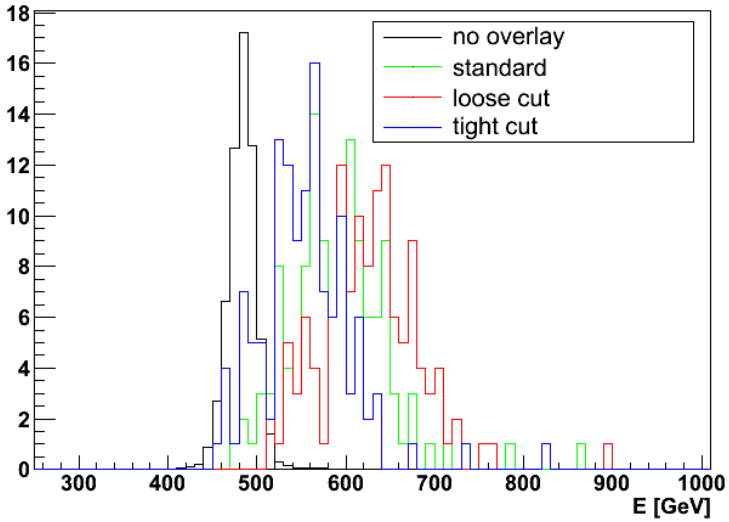
BUT:
We have Z→uds with 60 BX $\gamma\gamma$ background overlayed.
Jet energy reolution here would need real jet reconstruction, but I had a look anyway...

First look at overlay: Timing Cuts

E=91 GeV



E=500 GeV

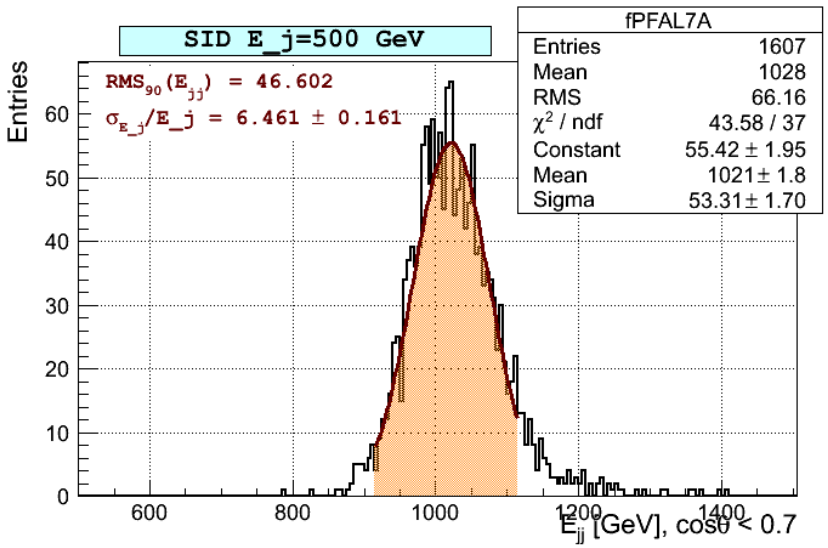


E_{jj} [GeV]	$mean_{90}(E_{jj})$ [GeV]			
	no overlay	loose	default	tight
91	89	241	200	166
500	484	621	587	553
1000	961	1097	1057	1020

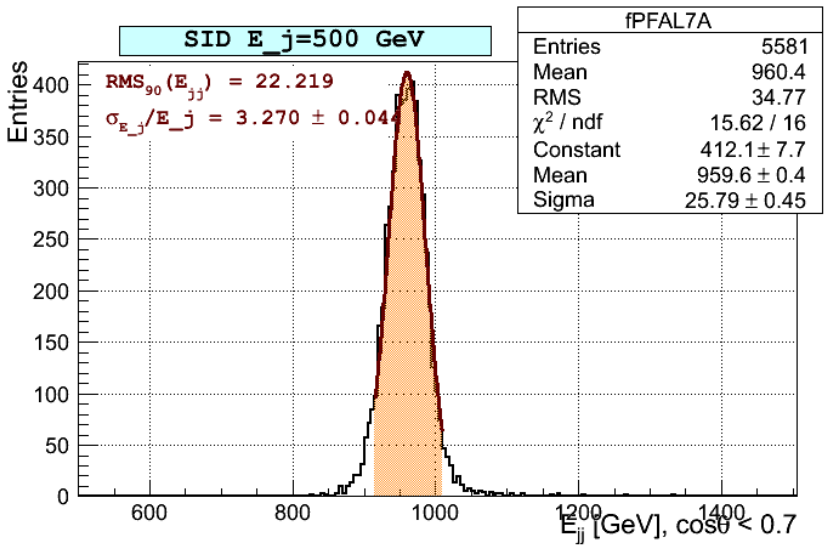
First look at overlay: Energy Resolution

Attention: This is not a jet energy resolution anymore, but rather an energy resolution of the event!

60 BX, default cut



no Overlay



E_j [GeV]	energy resolution $rms_{90}(E_j)/mean_{90}(E_j)$ [%]			
	no overlay	loose	default	tight
45.5	4.8 ± 0.1	25.6 ± 1.3	26.8 ± 1.3	29.4 ± 1.4
250	3.4 ± 0.1	9.7 ± 0.9	9.5 ± 0.8	9.3 ± 0.8
500	3.3 ± 0.1	6.9 ± 0.2	6.6 ± 0.2	6.5 ± 0.2