

Update on MIT sid02 HCAL variants study

Peter Fisher, Ray Cowan,
Raphael Cervantes

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MIT HCAL sid02 variants study

- This study covers
 - Lambda = 4.0, 4.5, 5.0, 5.5, 6.0
 - Number layers = 30, 40, 50, 60
 - Cell size 1x1 cm²
 - 10k qqbar events at 100, 200, 350, 500, and 1000 GeV
 - 9500 events at 1000 GeV
 - Problem with one event in one stdhep file
 - 10k ZZ→ nunubar, uds at 500 GeV
- Software
 - SLIC v2r5p4, LCPhys physics list, org.lcsim snapshot 1.4
- Run status
 - 6.0: sim done, reco done
 - See table on next page
 - 5.0: sim done, reco done
 - See table on next page
 - 4.0: sim done, reco done
 - See table on next page
 - 4.5: waiting
 - 5.5: waiting

Details

- Lambda_total is the total nuclear interaction length for the variant
 - Lambda_total = total absorber depth (in lambda) + total readout depth (in lambda)
- Readout layer geometry is fixed across all variants

Lambda = 4.0, barrel region

Variant	30 layers		40 layers		50 layers		60 layers		sid02 default*	
	m90	r90	m90	r90	m90	r90	m90	r90	m90	r90
qq100 Event energy	-0.2 (7278)	4.0%	-1.9 (6554)	3.8%	-1.3 (6554)	3.8%	-0.6 (6554)	4.0%	-1.8	3.7%
qq200 Event energy	-2.5 (7275)	3.3%	-5.2 (7275)	3.2%	-4.5 (7275)	3.1%	-2.1 (7275)	3.3%	-4.9	3.0%
qq350 Event energy	-6.7 (7177)	3.7%	-9.8 (7177)	3.5%	-8.6 (7177)	3.3%	-7.3 (7177)	3.8%	N/A	N/A
qq500 Event energy	-9.5 (6959)	4.5%	-16.8 (6959)	4.3%	-16.7 (6959)	3.9%	-8.2 (76959)	4.3%	-13.6	3.5%
qq1000 Event energy	-15.8 (6523)	7.2%	-40.0 (6876)	7.0%	-49.2 (6876)	6.5%	-8.9 (6442)	6.3%	N/A	N/A
ZZ500 Dijet mass	+0.6 (2372)	5.3%	-1.1 (2372)	5.0%	-0.8 (2372)	4.9%	-1.4 (2372)	5.8%	-1.2	4.7%

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(nnnn) \equiv # entries in aida cloud
* = M. Charles, LCWS08

Lambda = 5.0, barrel region

Variant	30 layers		40 layers		50 layers		60 layers		sid02 default*	
	m90	r90	m90	r90	m90	r90	m90	r90	m90	r90
qq100 Event energy	-1.9 (7278)	4.0%	-2.1 (7278)	3.9%	-2.4 (7278)	3.9%	-2.1 (7278)	3.5%	-1.8	3.7%
qq200 Event energy	-5.2 (7275)	3.3%	-5.2 (7275)	3.3%	-6.4 (7275)	3.0%	-5.9 (7275)	3.0%	-4.9	3.0%
qq350 Event energy	-8.6 (7177)	3.3%	-0.5 (7177)	3.4%	-13.9 (7177)	3.2%	-9.2 (7177)	3.1%	N/A	N/A
qq500 Event energy	-19.1 (7332)	3.9%	+2.4 (7332)	4.0%	-26.0 (7332)	3.8%	-14.0 (7332)	3.6%	-13.6	3.5%
qq1000 Event energy	-66.0 (6879)	6.1%	-12.6 (6879)	6.2%	-72.3 (6879)	6.0%	-32.1 (6590)	6.0%	N/A	N/A
ZZ500 Dijet mass	-1.3 (2370)	4.9%	-0.6 (2370)	4.9%	-1.9 (2370)	4.8%	-1.5 (2370)	4.7%	-1.2	4.7%

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(nnnn) \equiv # entries in aida cloud
* = M. Charles, LCWS08

Lambda = 6.0, barrel region

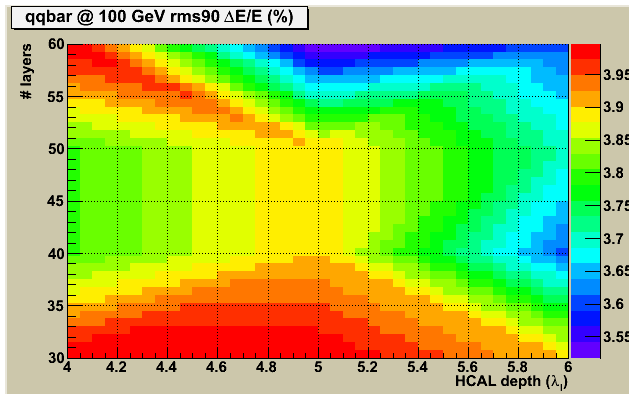
Variant	30 layers		40 layers		50 layers		60 layers		sid02 default*	
	m90	r90	m90	r90	m90	r90	m90	r90	m90	r90
qq100 Event energy	-1.7 (7278)	3.9%	-2.3 (7278)	3.6%	-2.1 (7278)	3.7%	-2.1 (7278)	3.6%	-1.8	3.7%
qq200 Event energy	-5.2 (7275)	3.1%	-6.7 (7275)	3.0%	-6.1 (7275)	3.0%	-5.8 (7275)	3.0%	-4.9	3.0%
qq350 Event energy	-7.8 (7177)	3.1%	-11.0 (7177)	3.0%	-9.2 (7177)	3.5%	-6.9 (7177)	3.2%	N/A	N/A
qq500 Event energy	-11.5 (7332)	3.6%	-17.3 (7332)	3.5%	-9.6 (7332)	3.9%	-6.4 (7332)	3.8%	-13.6	3.5%
qq1000 Event energy	-22.9 (6523)	5.9%	-38.3 (6876)	5.7%	-2.8 (6876)	6.3%	+1.4 (6876)	6.1%	N/A	N/A
ZZ500 Dijet mass	-1.3 (2370)	4.8%	-2.1 (2370)	4.7%	-1.6 (2370)	4.8%	-1.4 (2370)	4.8%	-1.2	4.7%

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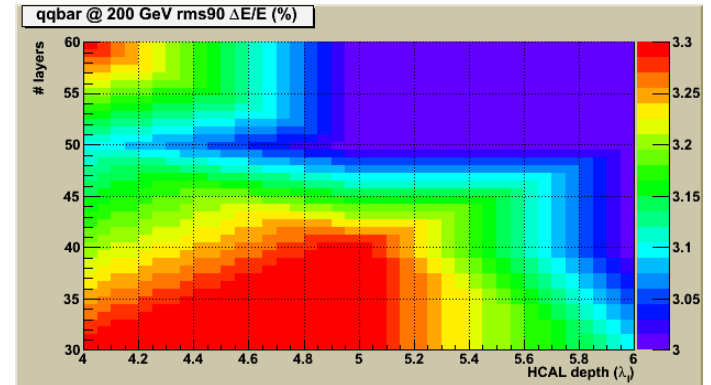
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(nnnn) ≡ # entries in aida cloud
* = M. Charles, LCWS08

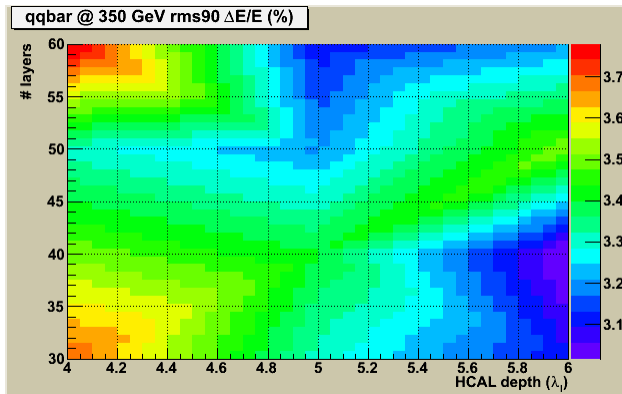
**qqbar
100 GeV**



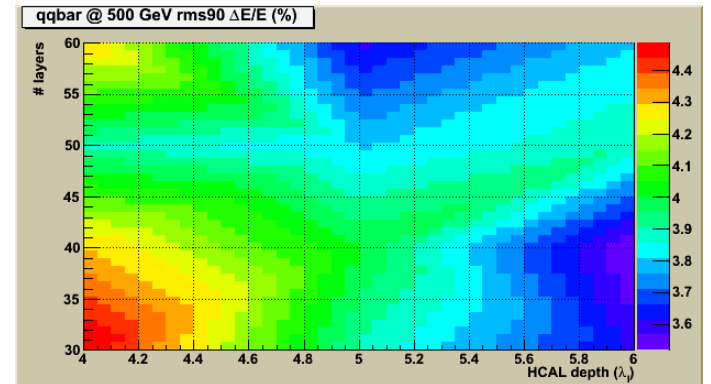
**qqbar
200 GeV**



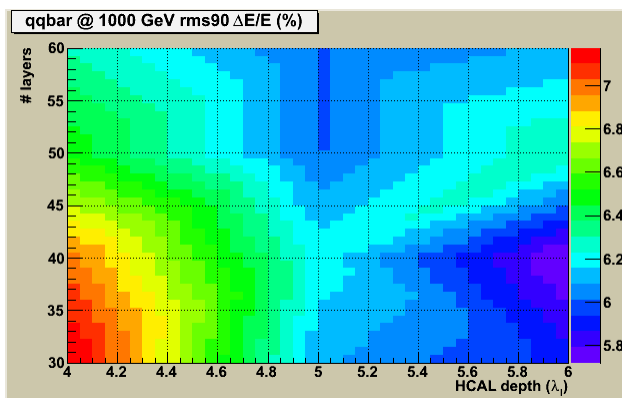
**qqbar
350 GeV**



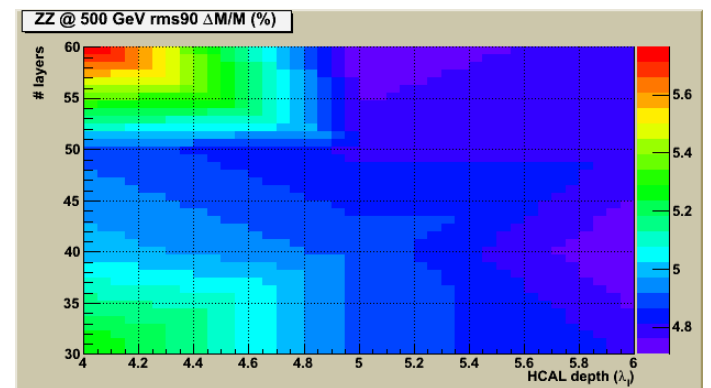
**qqbar
500 GeV**



**qqbar
1000 GeV**



**ZZ
500 GeV**

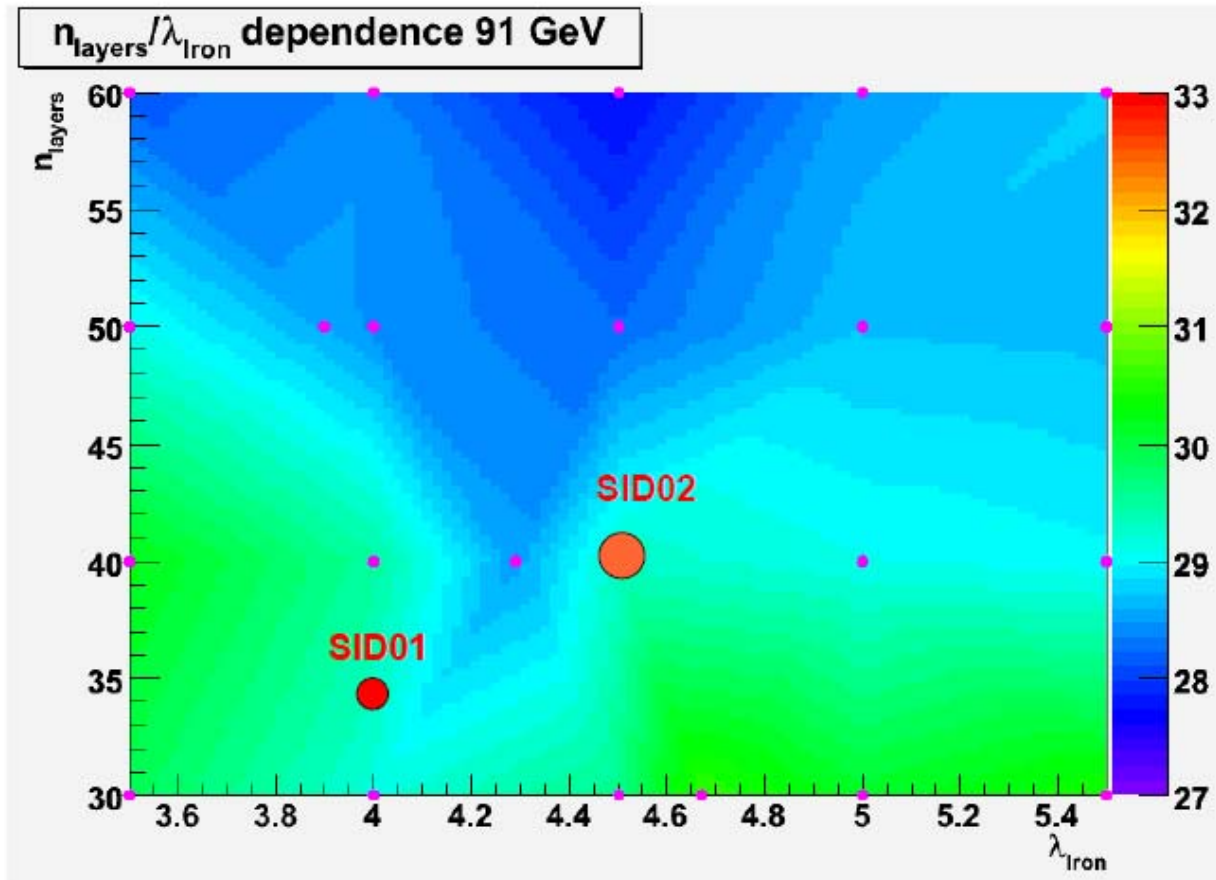


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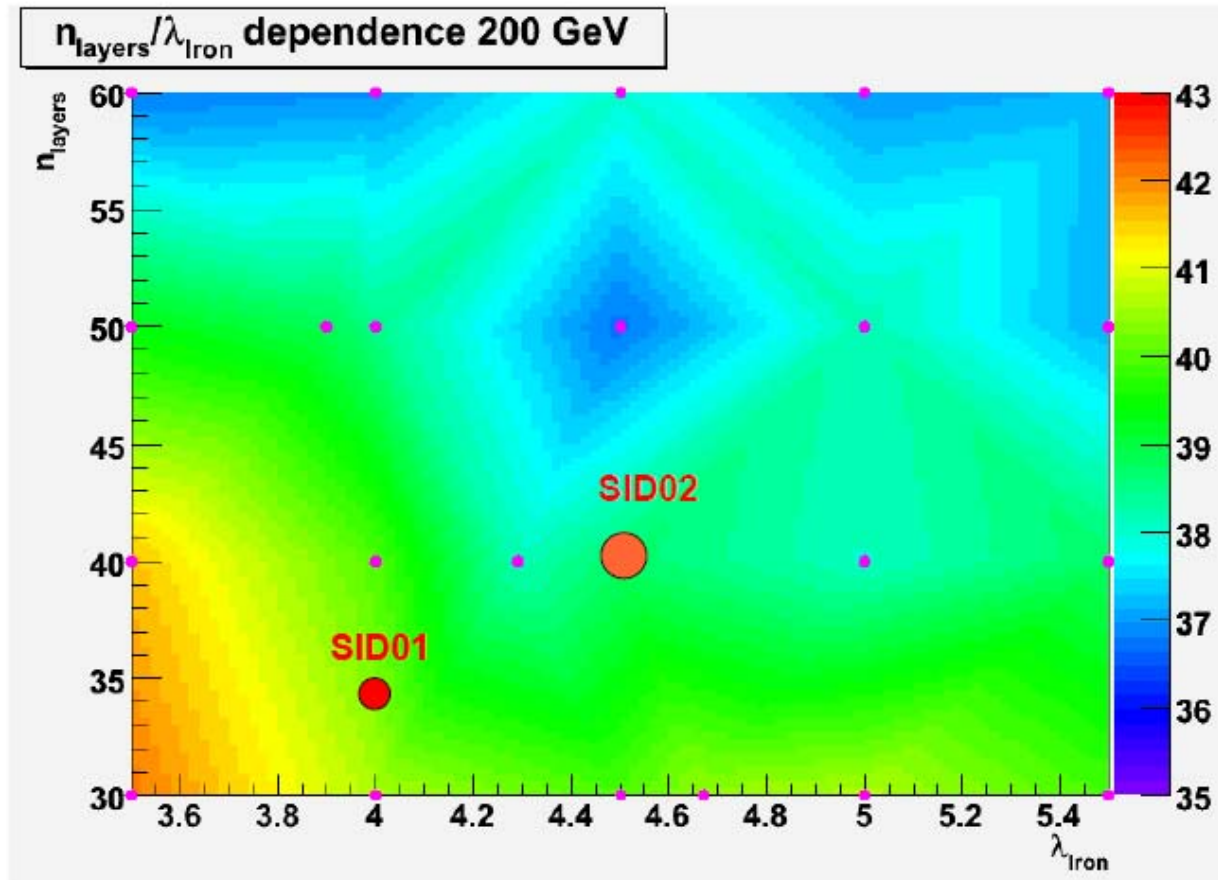


Results at 91 GeV

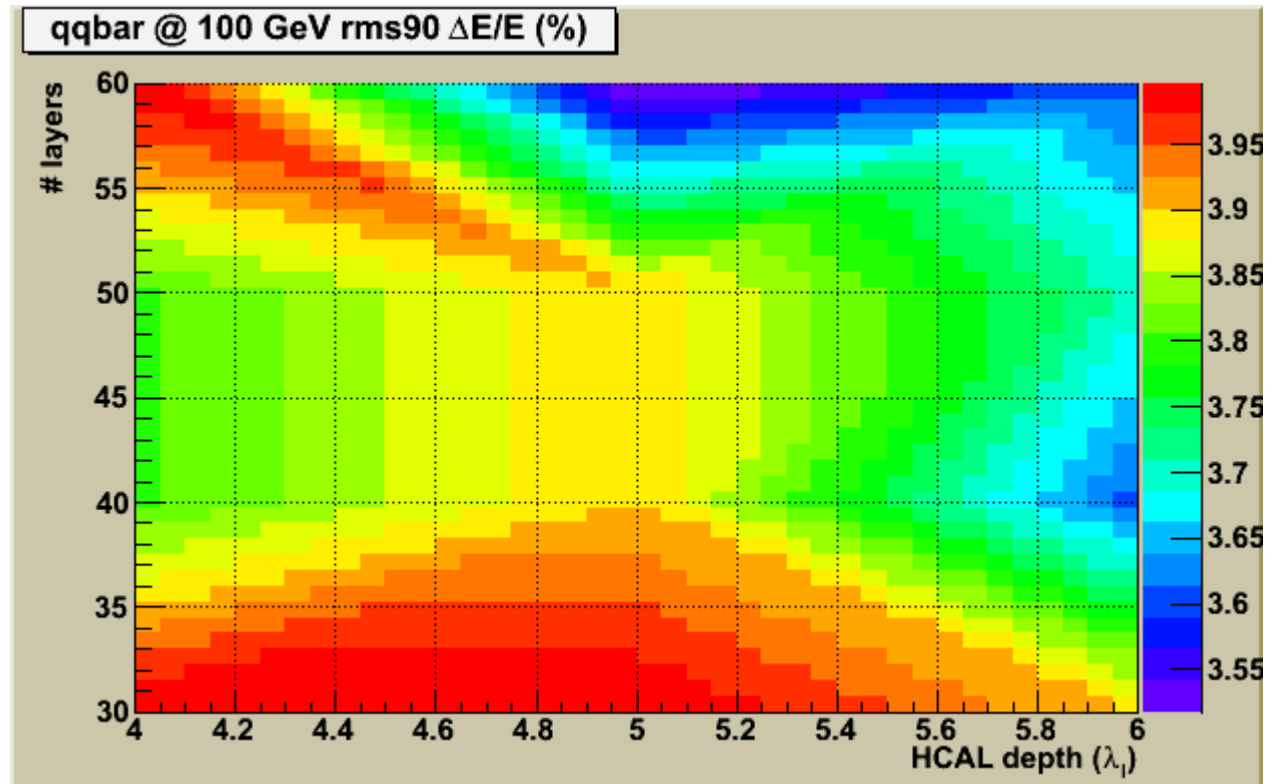




Results at 200 GeV



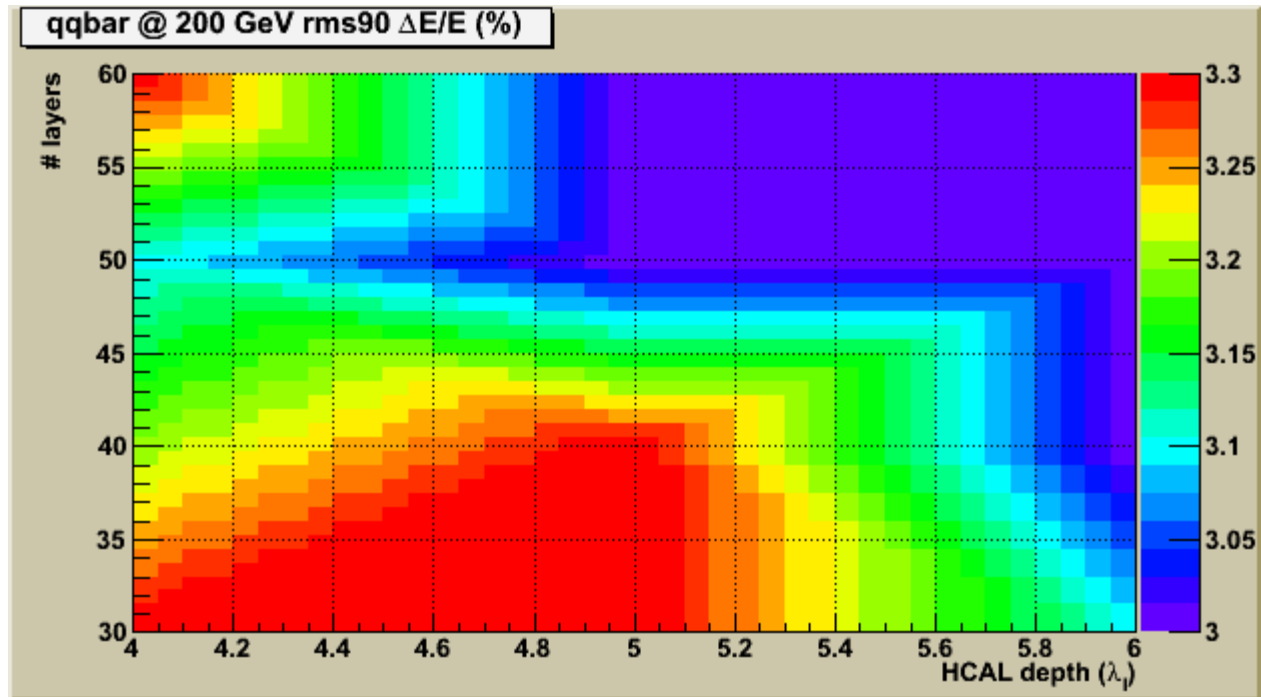
SiD rms90 qqbar 100 GeV



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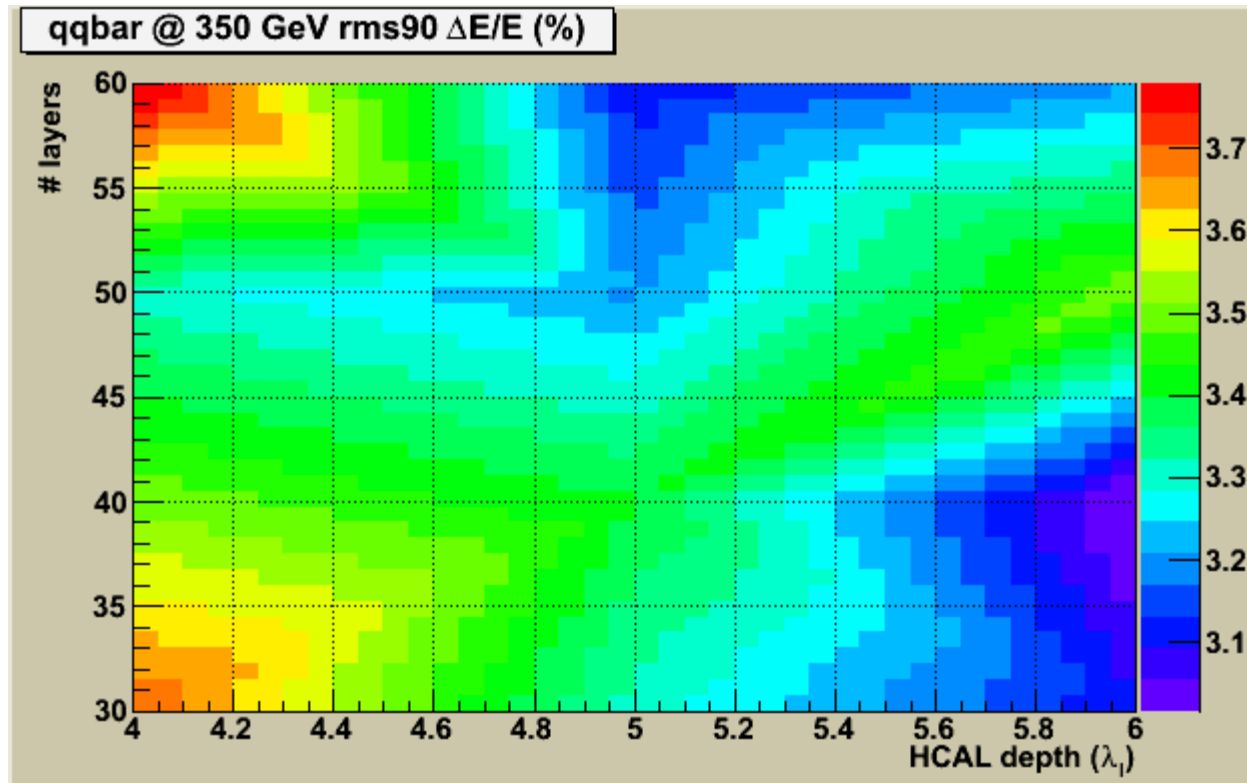
SiD rms90 qqbar 200 GeV



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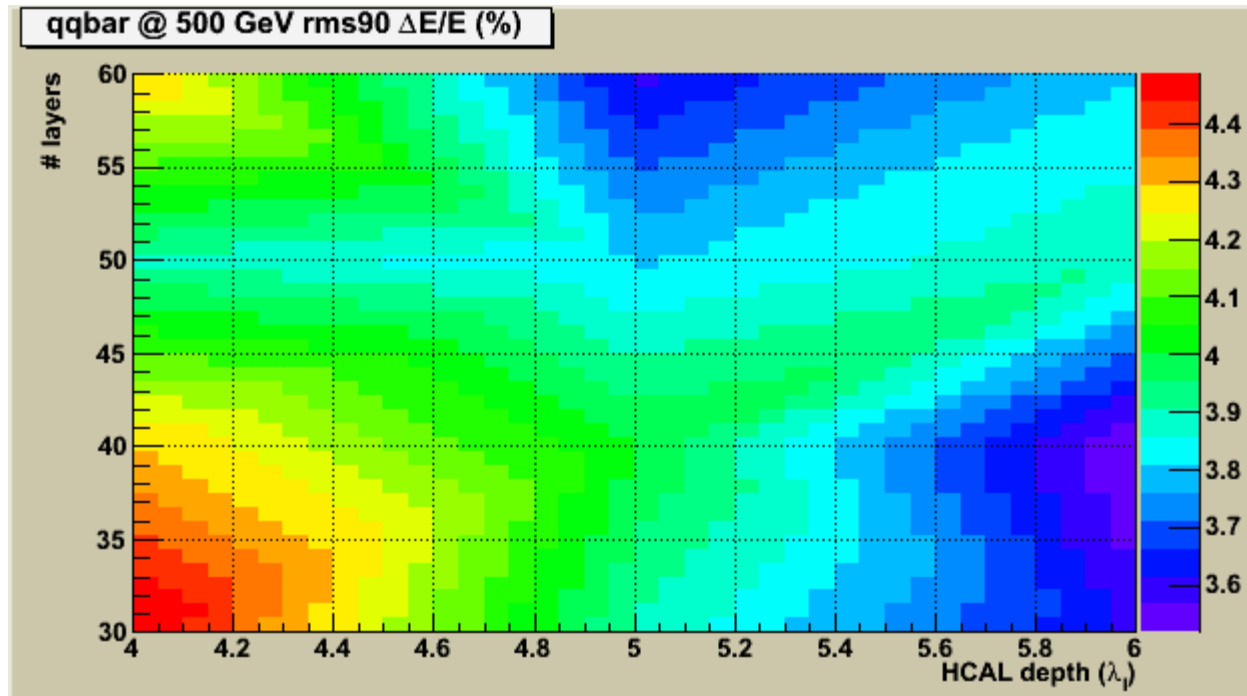
SiD rms90 qqbar 350 GeV



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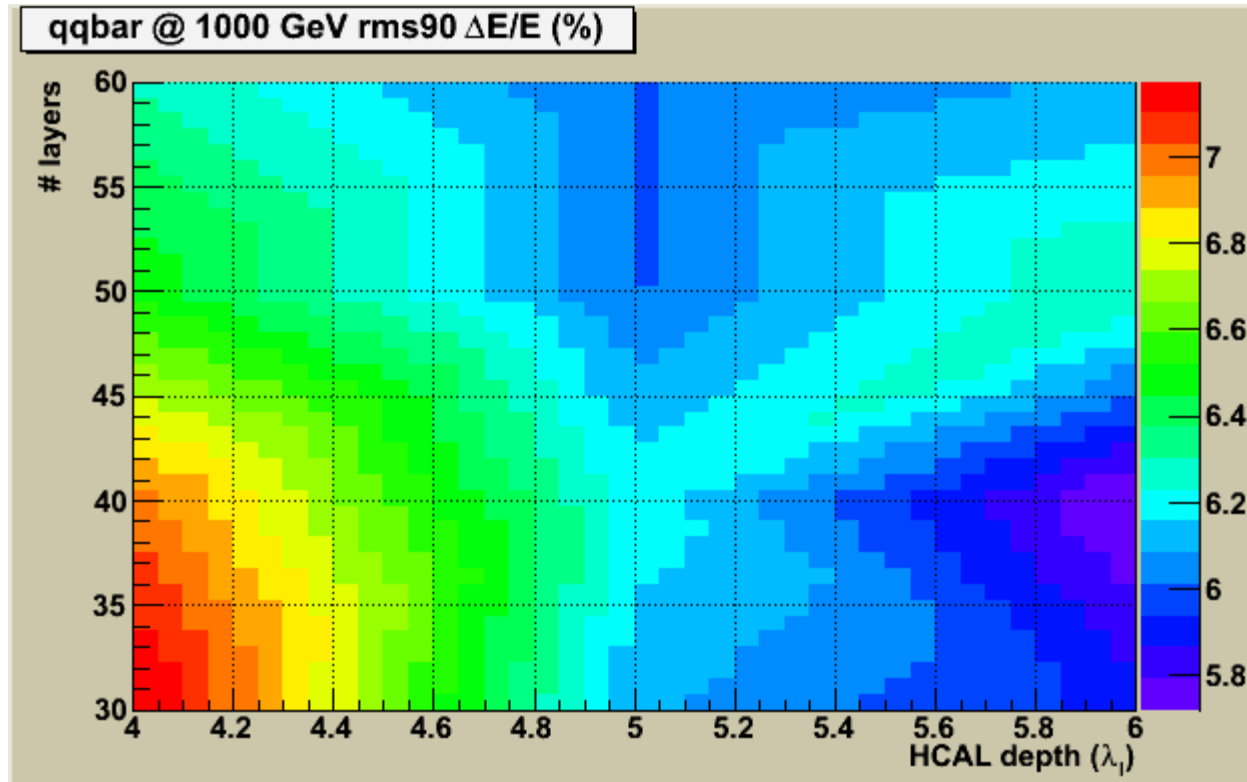
SiD rms90 qqbar 500 GeV



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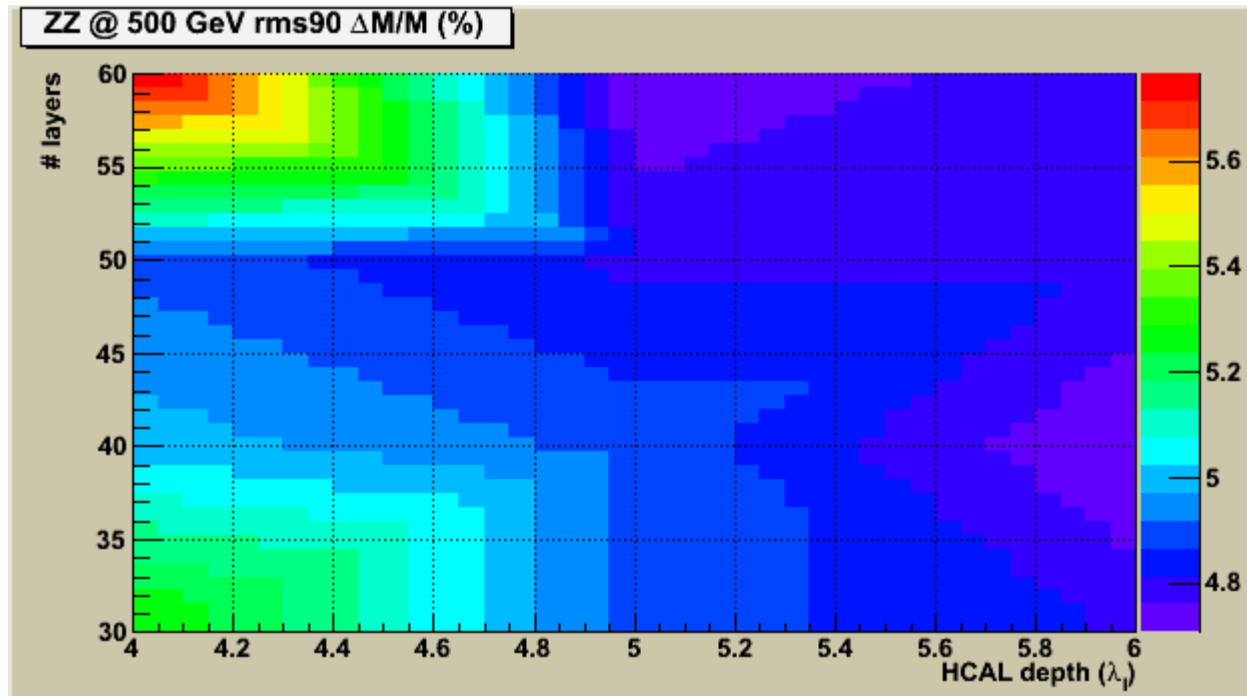
SiD rms90 qqbar 1000 GeV



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SiD rms90 ZZ 100 GeV



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