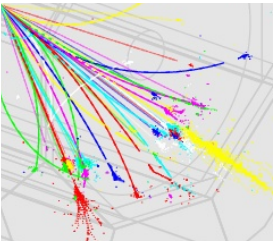
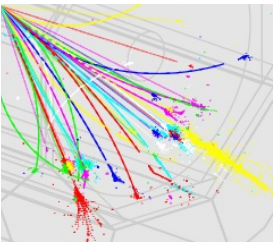


And more ...

SiD PFA Meeting

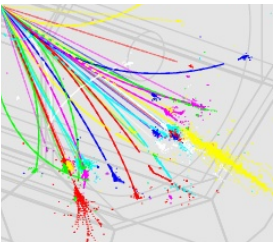
04.06.2008

M. Stanitzki



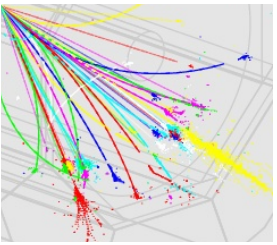
Segmentation studies

- First approach
  - keep the total HCAL thickness constant
  - vary steel thickness and number of scintillator layers
  - Detector tags SIDish_v2_hcal**XX** (XX= number of layers)
- Second approach
  - keep λ_{Iron} constant at n λ
  - vary steel thickness and number of scintillator layers
  - Detector tags SIDish_v2_hcal**XX_lYY**
    - XX= number of layers)
    - YY= number of lambda



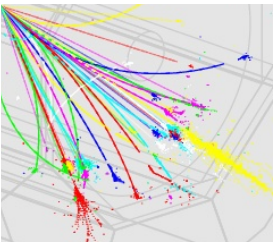
The matrix

- vary λ_{Iron} between 3.5 and 5.5 in 0.5 steps
- vary N_{layer} between 30 and 60 in 0.5 steps
- 20 Variations
- All points passed through Mokka



The variants

TAG	Layers	total thickness	Iron thickness	Scintillator thickness	HCAL thickness	λ_{tot}
SIDish_v2_hcal30	30	32.7	26.2	6.5	980	4.92
SIDish_v2_hcal40	40	24.5	18.0	6.5	980	4.61
SIDish_v2_hcal50	50	19.6	13.1	6.5	980	4.45
SIDish_v2_hcal30_I45	30	31.7	25.2	6.5	951	4.75
SIDish_v2_hcal40_I45	40	25.4	18.9	6.5	1016	4.83
SIDish_v2_hcal50_I45	50	21.6	15.1	6.5	1081	4.91
SIDish_v2_hcal60_I45	60	21.6	15.1	6.5	1081	4.91
SIDish_v2_hcal30_I50	30	34.5	28.0	6.5	1035	5.25
SIDish_v2_hcal40_I50	40	27.5	21.0	6.5	1100	5.33
SIDish_v2_hcal50_I50	50	23.3	16.8	6.5	1165	5.41
SIDish_v2_hcal60_I50	60	20.5	14.0	6.5	1230	5.49
SIDish_v2_hcal30_I55	30	37.3	30.8	6.5	1119	5.75
SIDish_v2_hcal40_I55	40	29.6	23.1	6.5	1184	5.83
SIDish_v2_hcal50_I55	50	25.0	18.5	6.5	1249	5.91
SIDish_v2_hcal60_I55	60	21.9	15.4	6.5	1314	5.99
SIDish_v2_hcal30_I40	30	28.9	22.4	6.5	867	4.25
SIDish_v2_hcal40_I40	40	23.3	16.8	6.5	932	4.33
SIDish_v2_hcal50_I40	50	19.9	13.4	6.5	997	4.41
SIDish_v2_hcal60_I40	60	17.7	11.2	6.5	1062	4.49
SIDish_v2_hcal30_I35	30	26.1	19.6	6.5	783	3.75
SIDish_v2_hcal40_I35	40	21.2	14.7	6.5	848	3.83
SIDish_v2_hcal50_I35	50	18.3	11.8	6.5	913	3.91
SIDish_v2_hcal60_I35	60	16.3	9.8	6.5	978	3.99



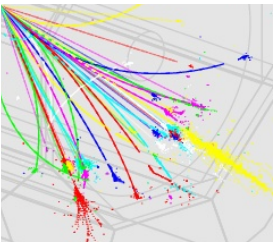
Status

	30	40	50	60
3.5				
4.0				
4.5				
5.0				
5.5				

Not Done

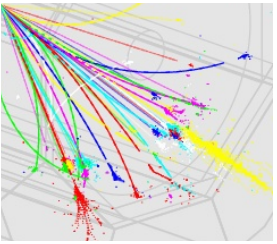
Parts Done

Done



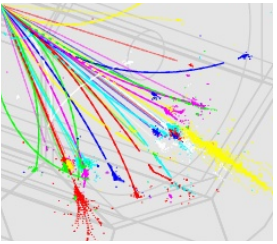
The results

Detector Tag	Layers	uds (91 Gev)		uds (200 GeV)	
		α %	Error	α %	Error
SIDish_v2_hcal30	30	30.5	0.4	40.5	0.7
SIDish_v2_hcal40	40	28.5	0.5	38.2	0.7
SIDish_v2_hcal50	50	28.6	0.4	38.8	0.8
SIDish_v2_hcal30_l45	30	29.6	0.4	39.9	0.7
SIDish_v2_hcal40_l45	40	29.3	0.4	38.7	0.7
SIDish_v2_hcal50_l45	50	28.2	0.7	36.7	0.7
SIDish_v2_hcal60_l45	60	27.7	0.4	38.0	0.8
SIDish_v2_hcal30_l50	30	30.1	0.4	40.6	0.8
SIDish_v2_hcal40_l50	40	29.1	0.4	38.1	0.7
SIDish_v2_hcal50_l50	50	28.7	0.4	38.2	0.7
SIDish_v2_hcal60_l50	60	28.5	0.4	37.0	0.7
SIDish_v2_hcal30_l55	30	30.4	0.4	39.9	0.7
SIDish_v2_hcal40_l55	40	29.0	0.4	38.7	0.7
SIDish_v2_hcal50_l55	50	28.7	0.4	37.1	0.7
SIDish_v2_hcal60_l55	60	28.7	0.4	37.1	0.7
SIDish_v2_hcal30_l40	30	29.1	0.4	40.6	0.7
SIDish_v2_hcal40_l40	40			39.9	0.8
SIDish_v2_hcal50_l40	50			38.5	0.8

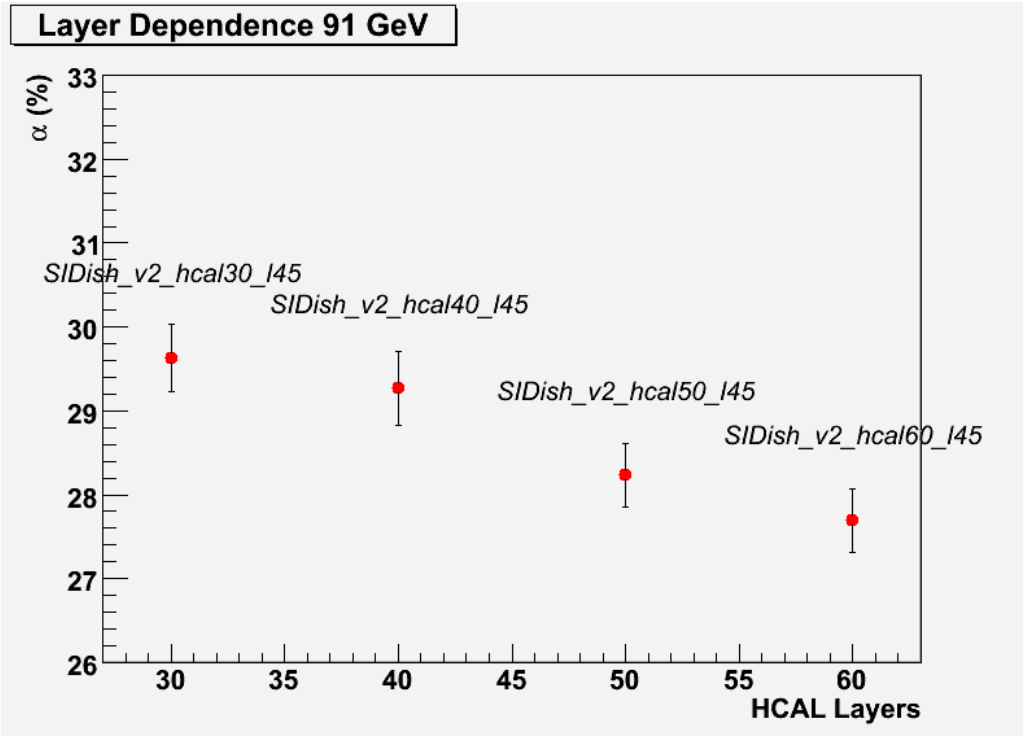


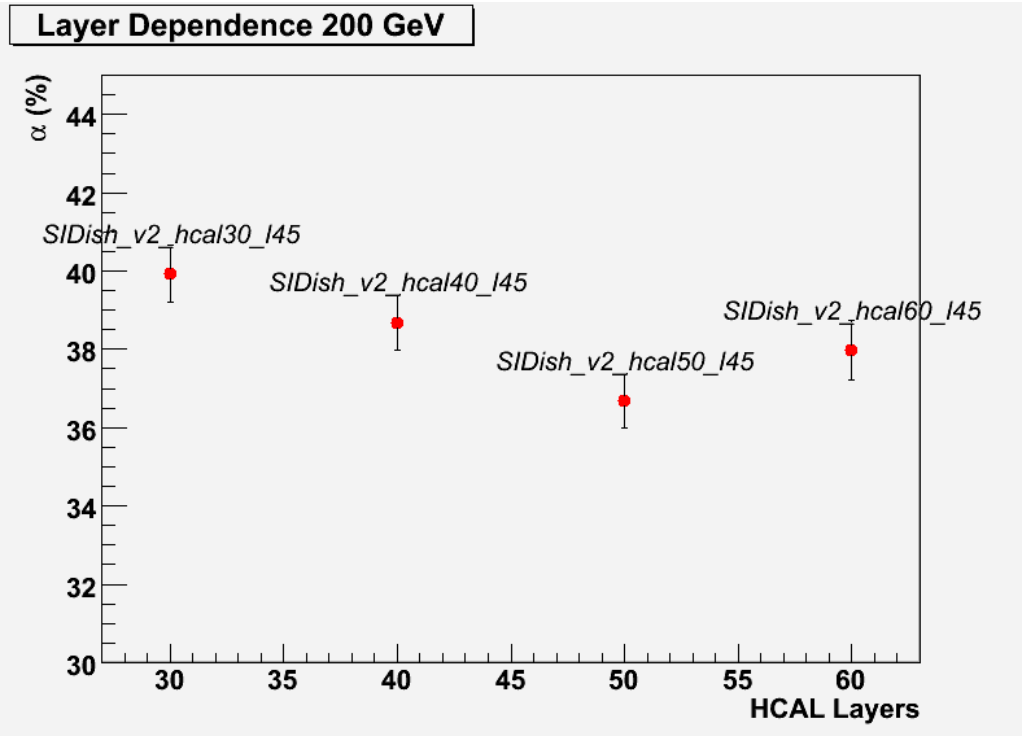
Fixed 4.5 λ_{Iron}

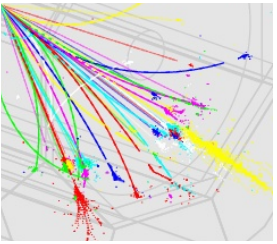
SIDish_v2_hcalXX_l45



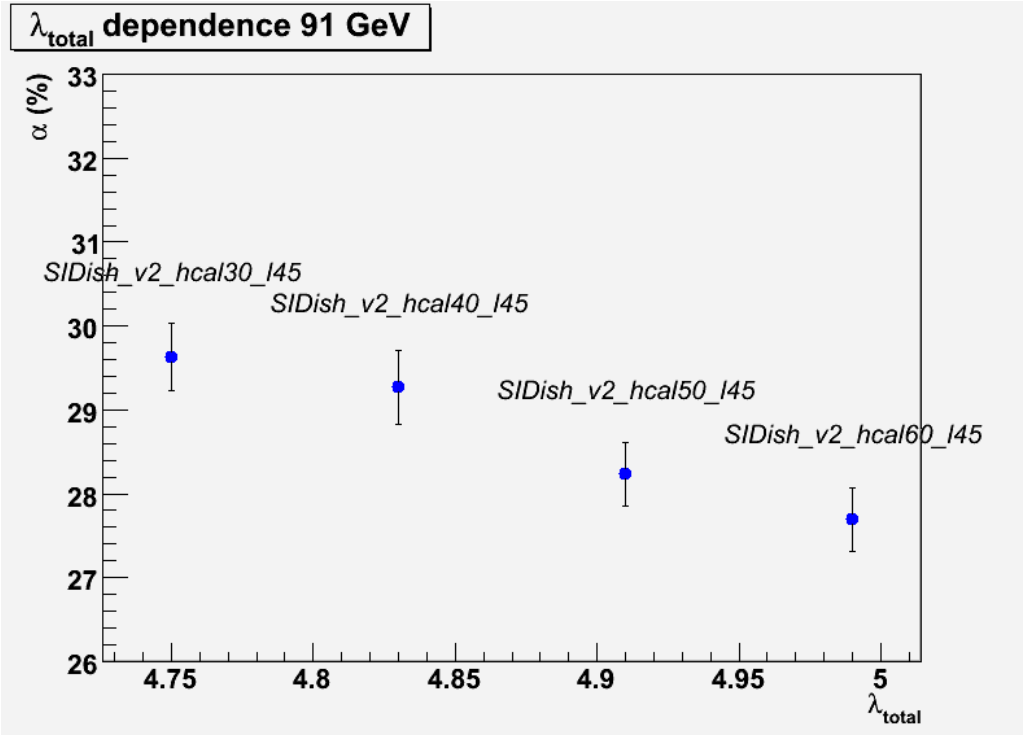
Number of layers

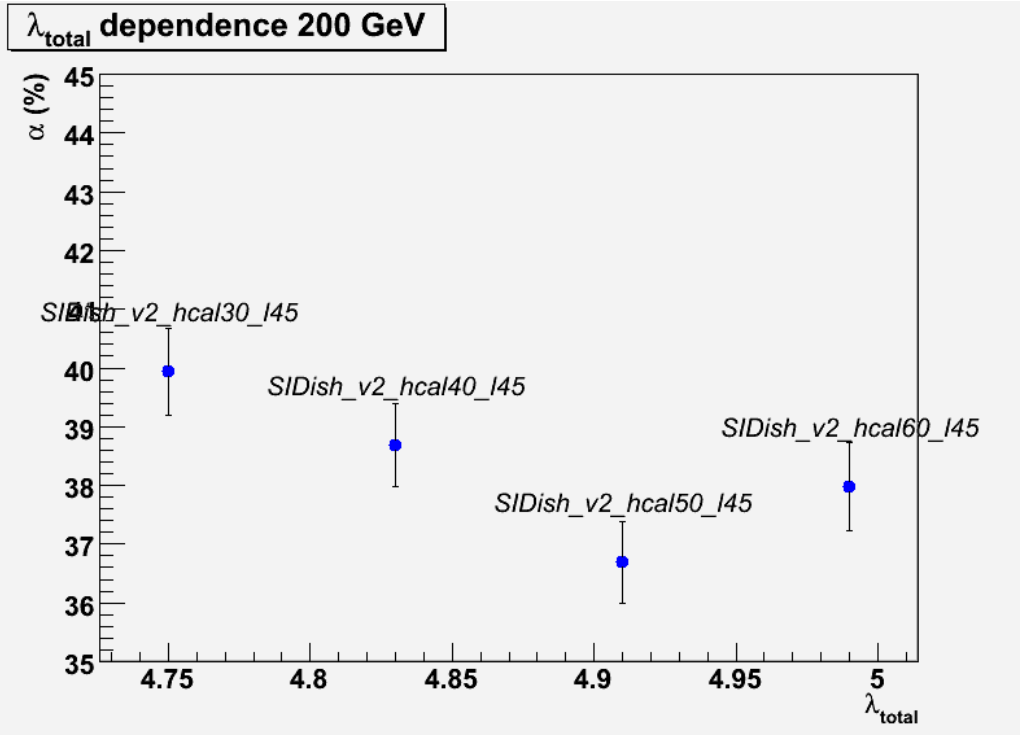


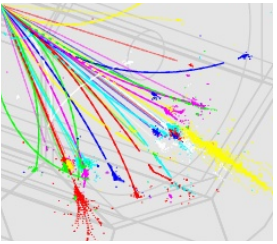




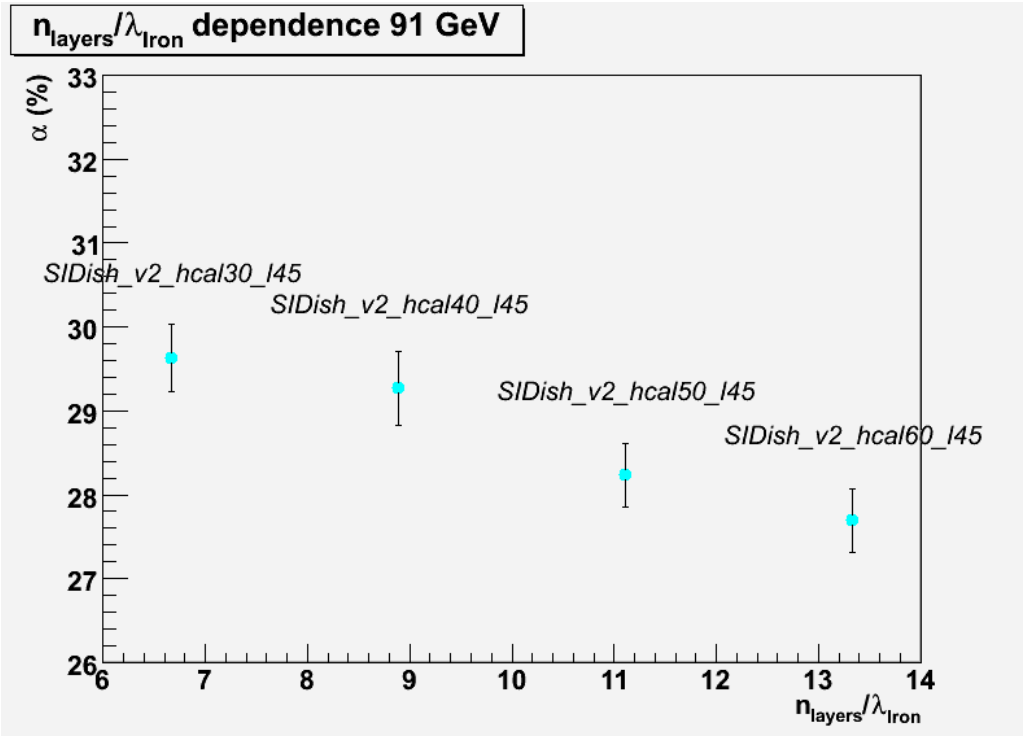
λ_{Total}

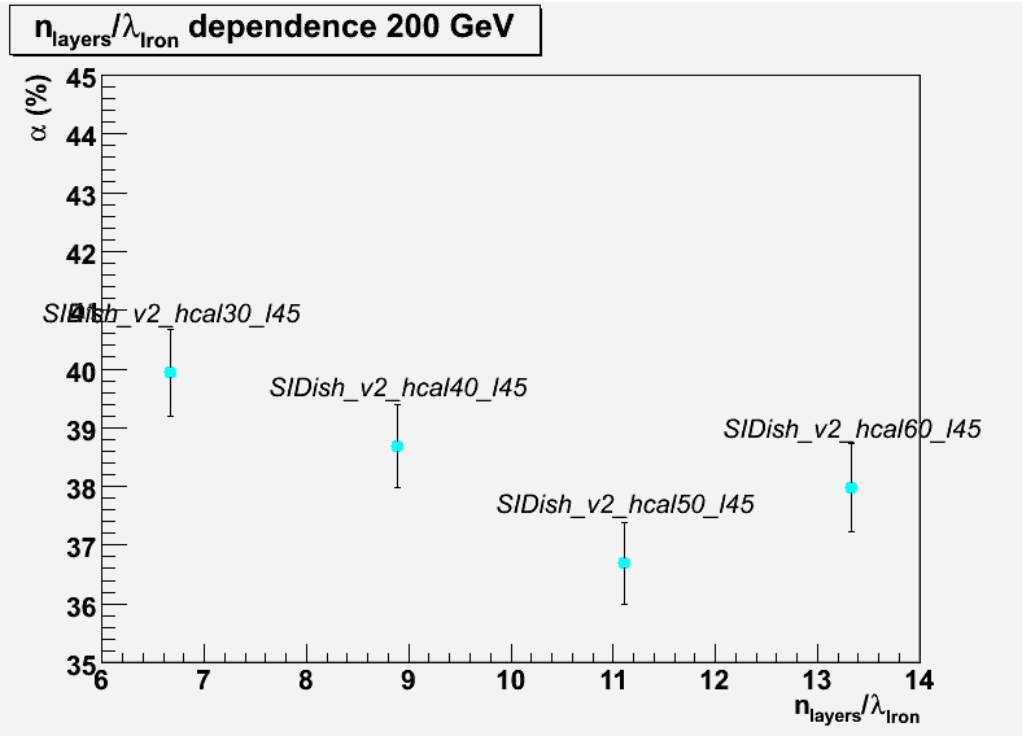


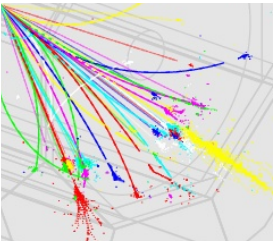




n_{Layers} / λ_{Iron}

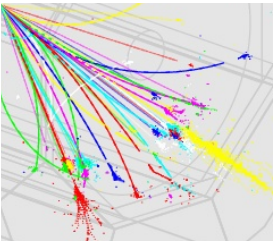




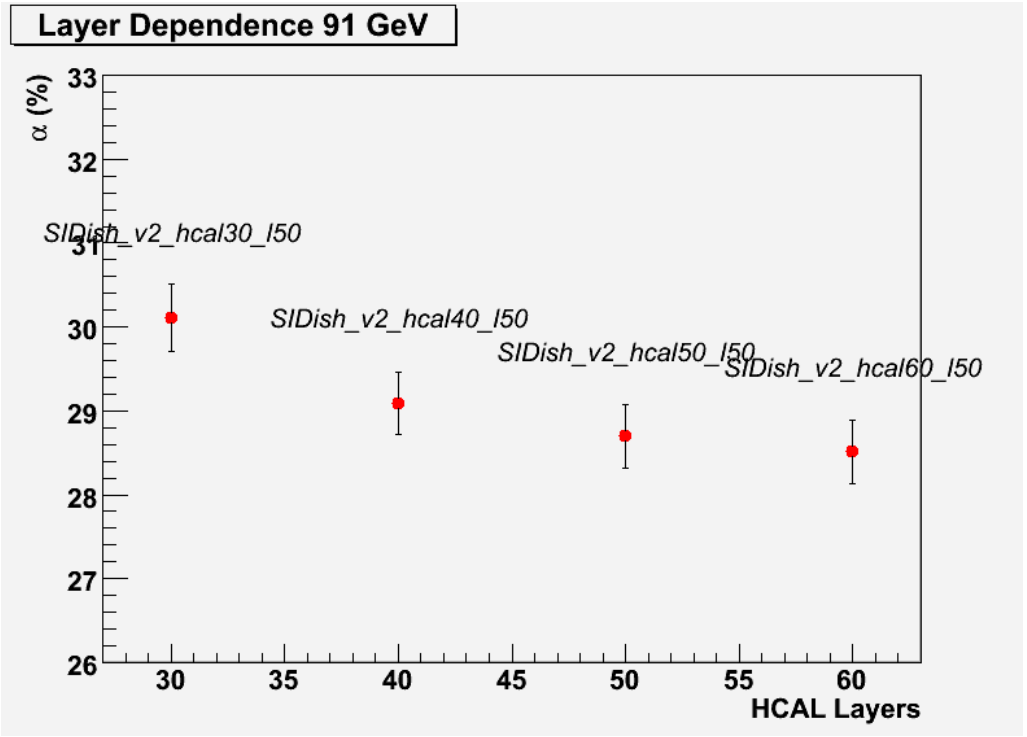


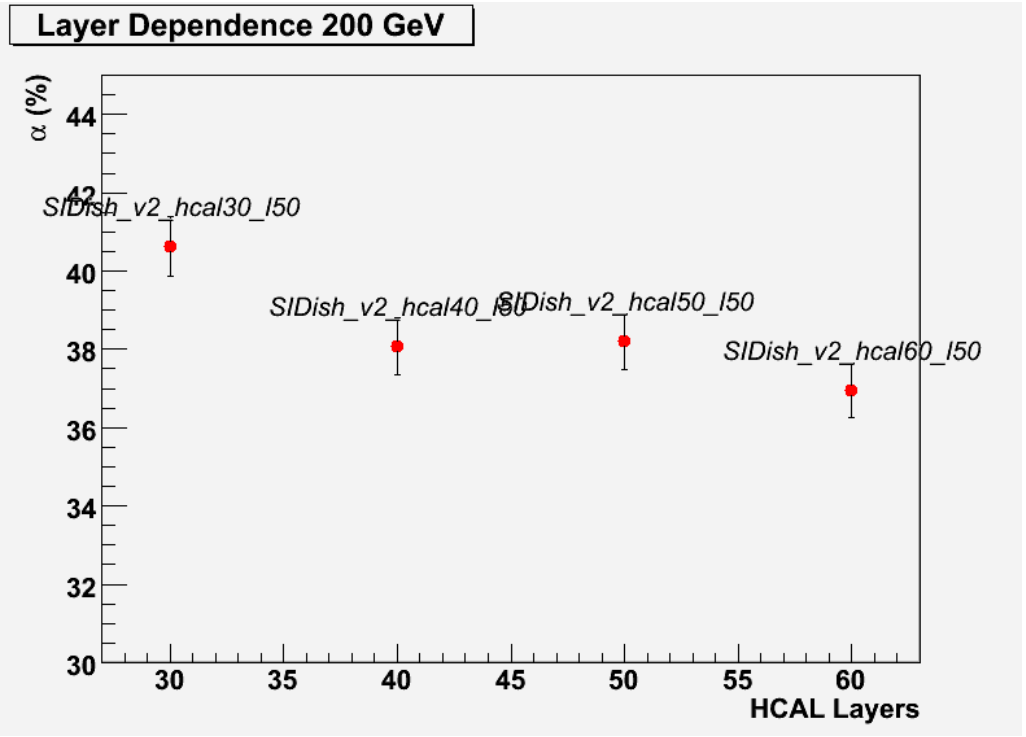
Fixed 5.0 λ_{Iron}

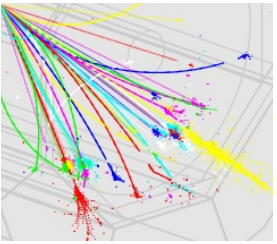
SIDish_v2_hcalXX_l50



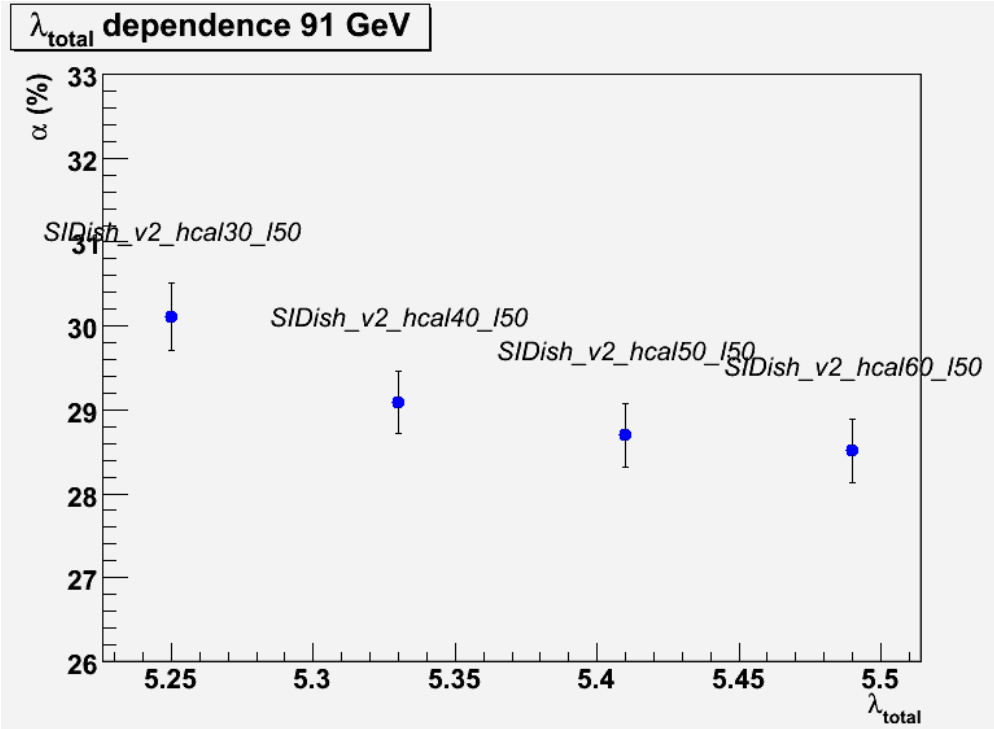
Number of layers

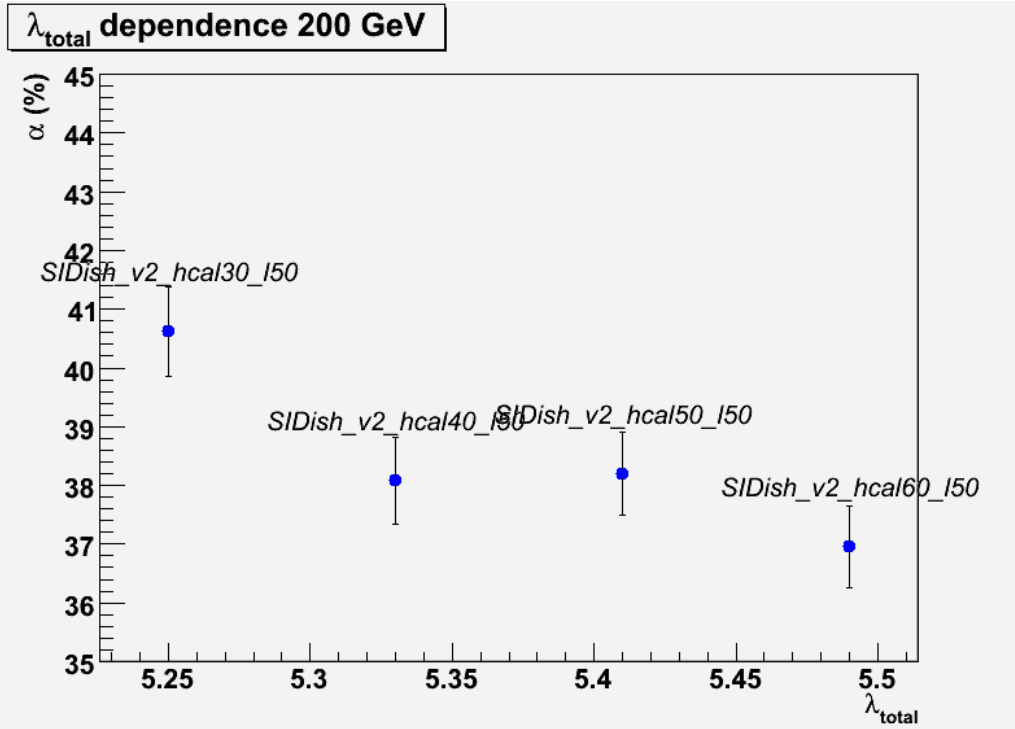


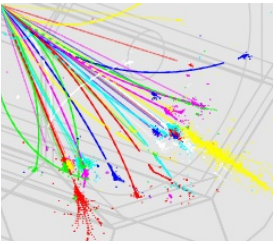




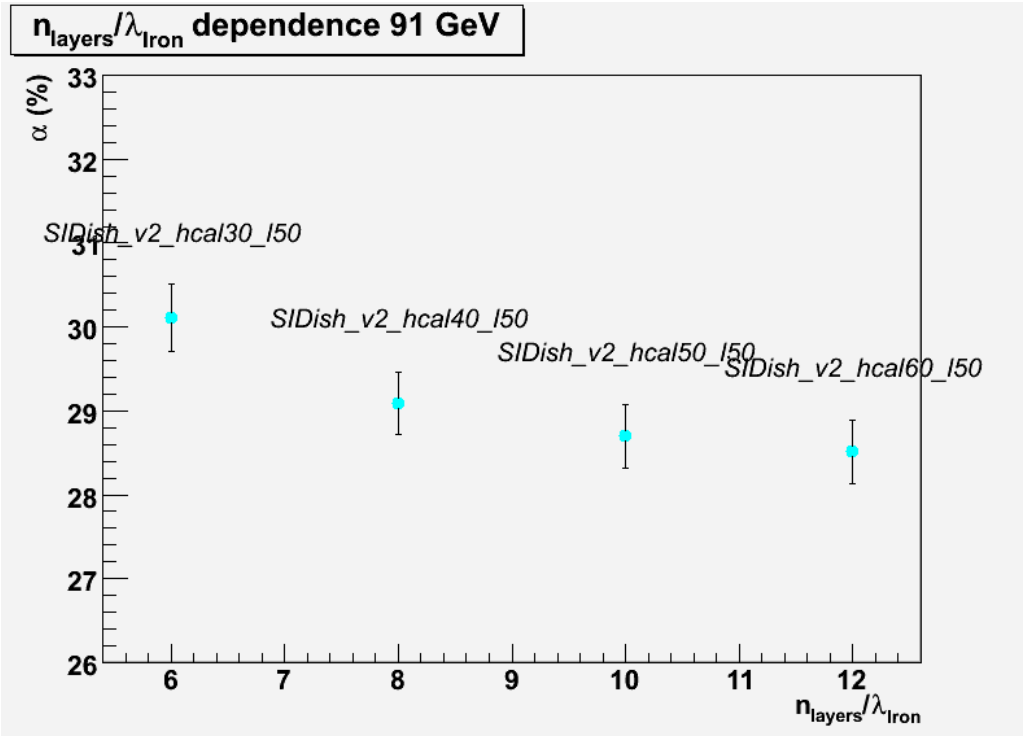
λ_{Total}

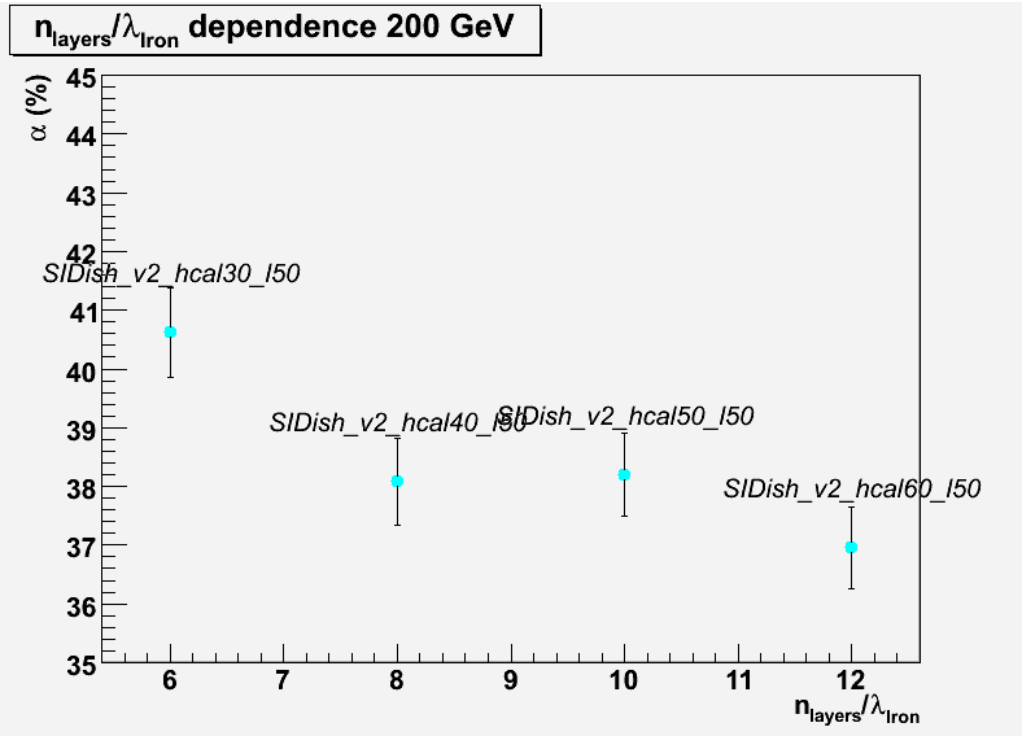


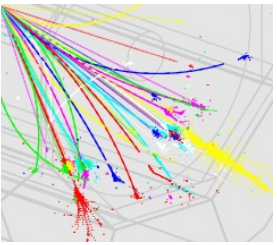




n_{Layers} / λ_{Iron}

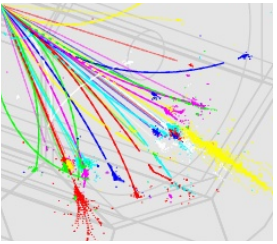




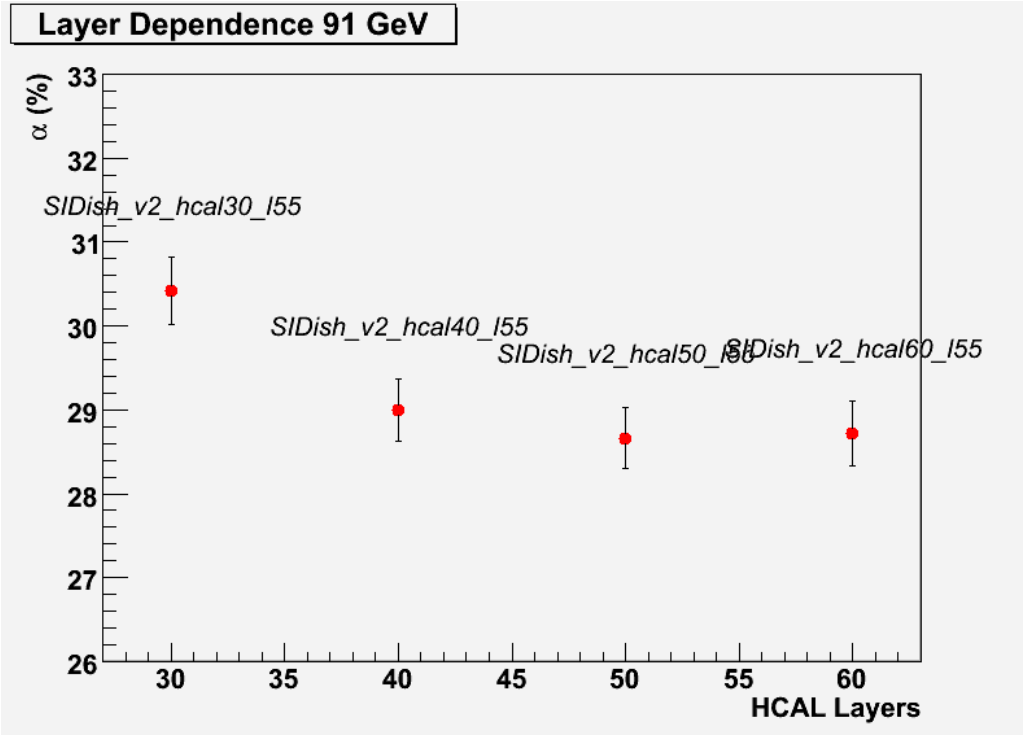


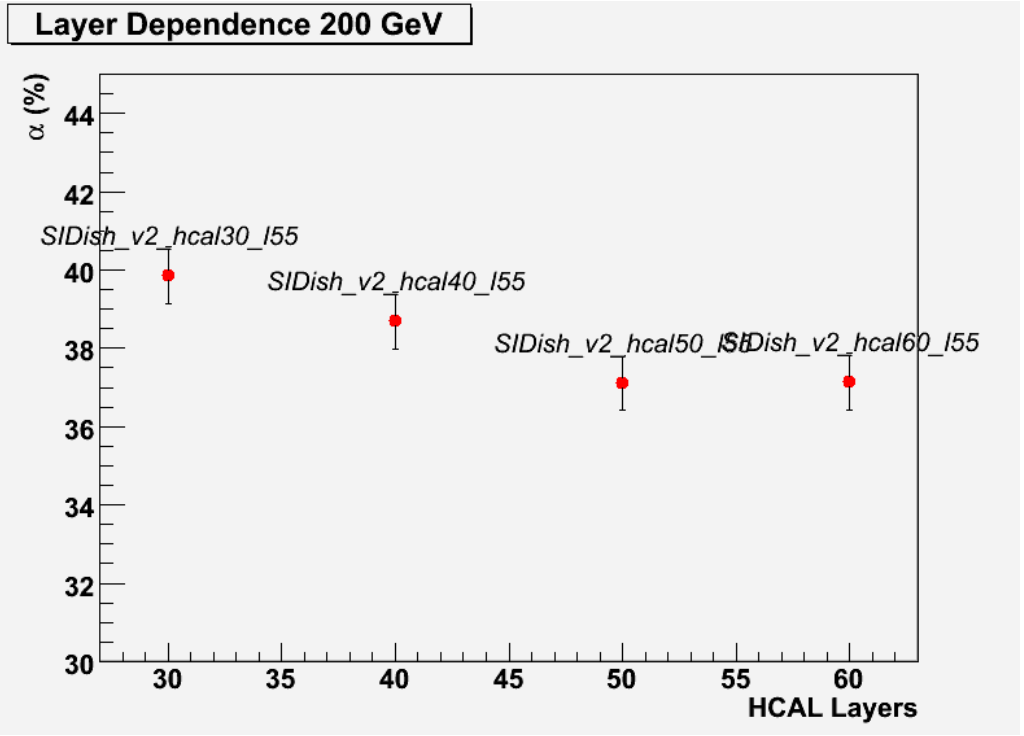
Fixed 5.5 λ_{Iron}

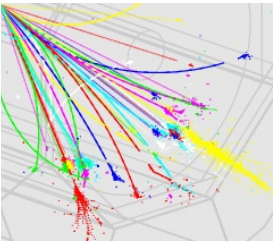
SIDish_v2_hcalXX_l55



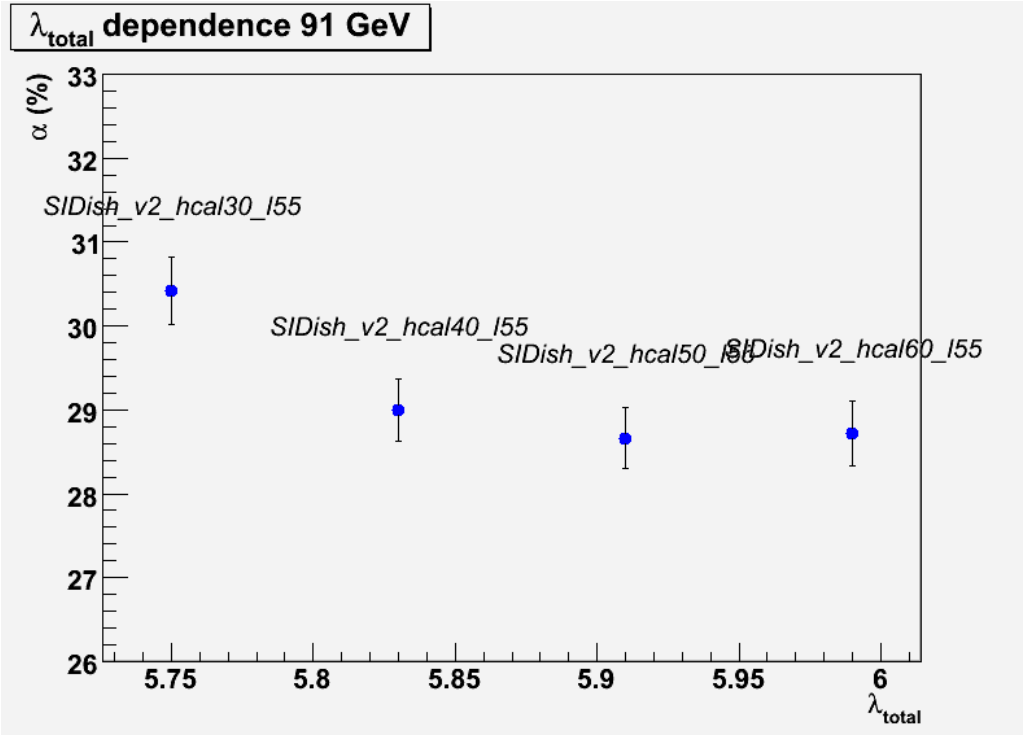
Number of layers

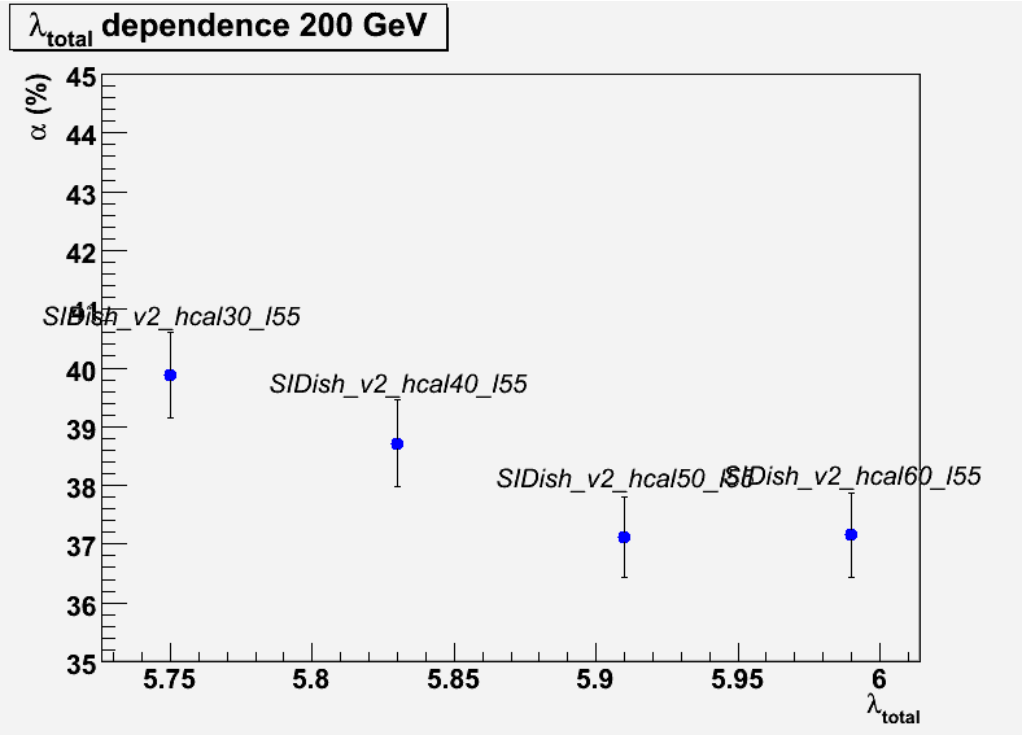


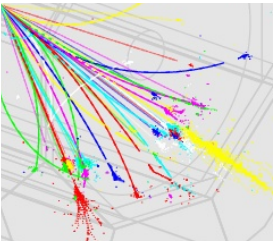




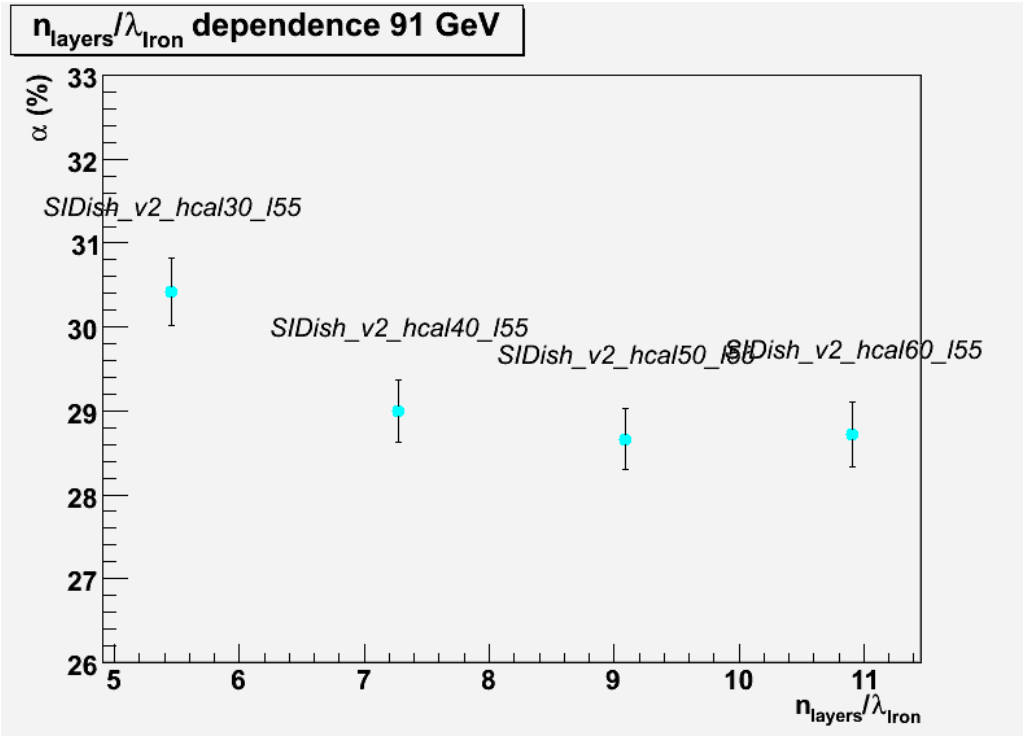
λ_{Total}

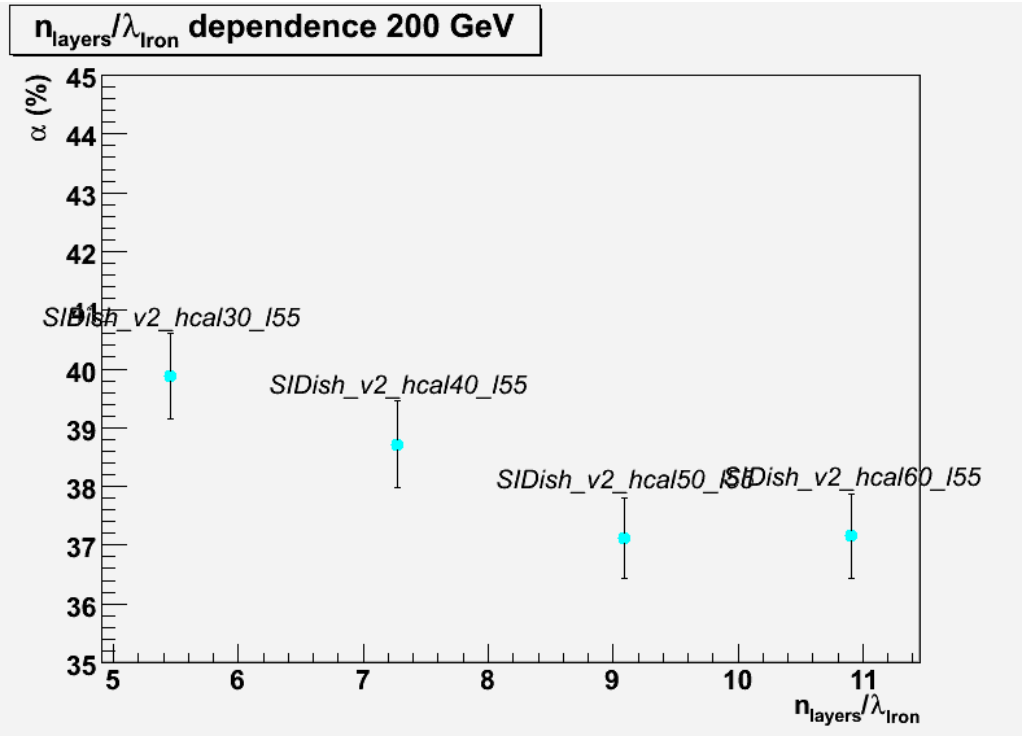


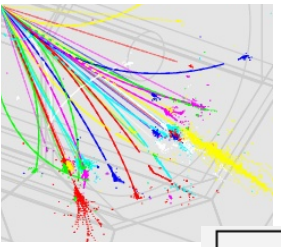




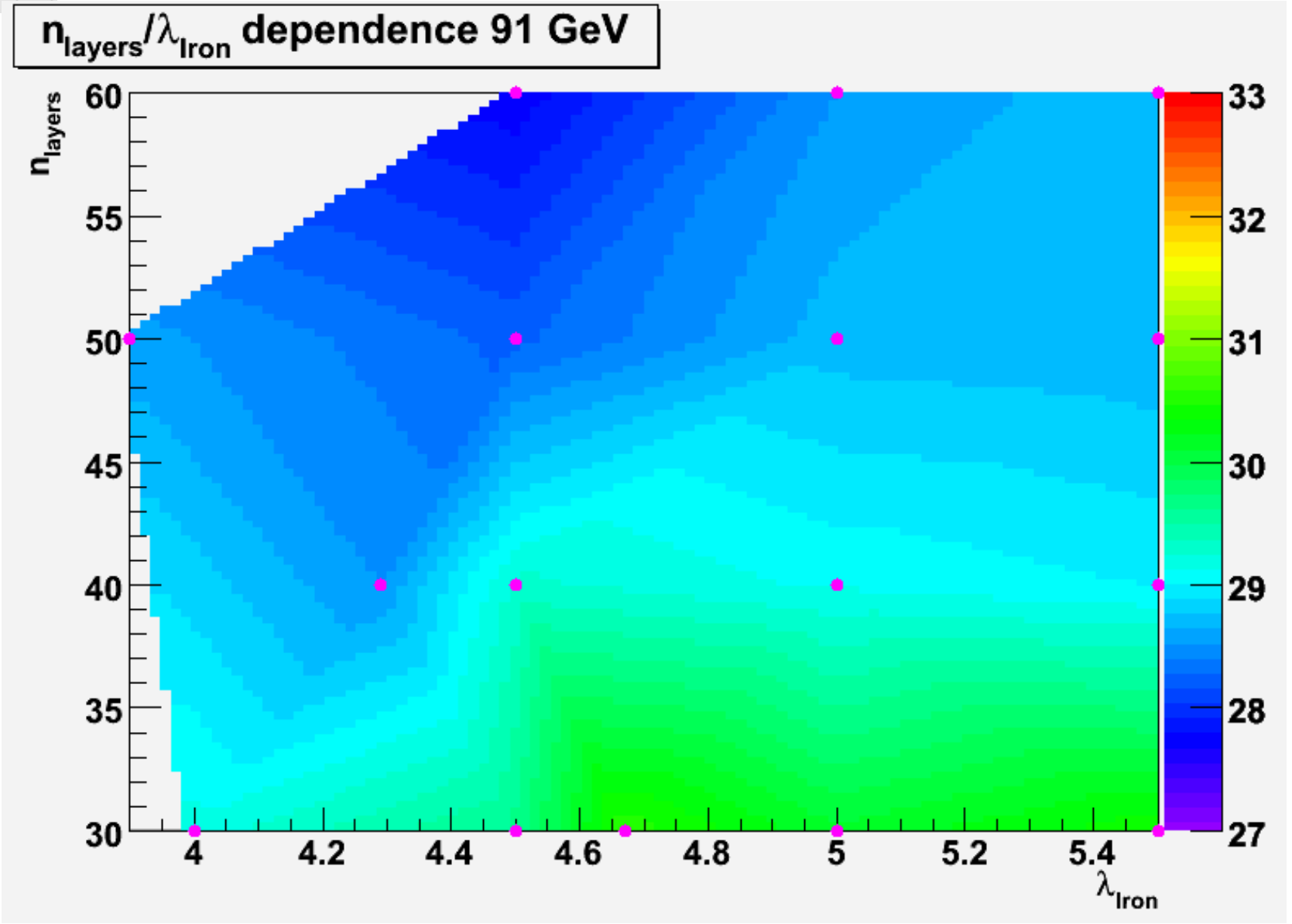
n_{Layers} / λ_{Iron}

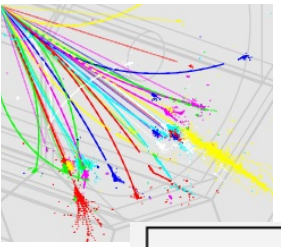




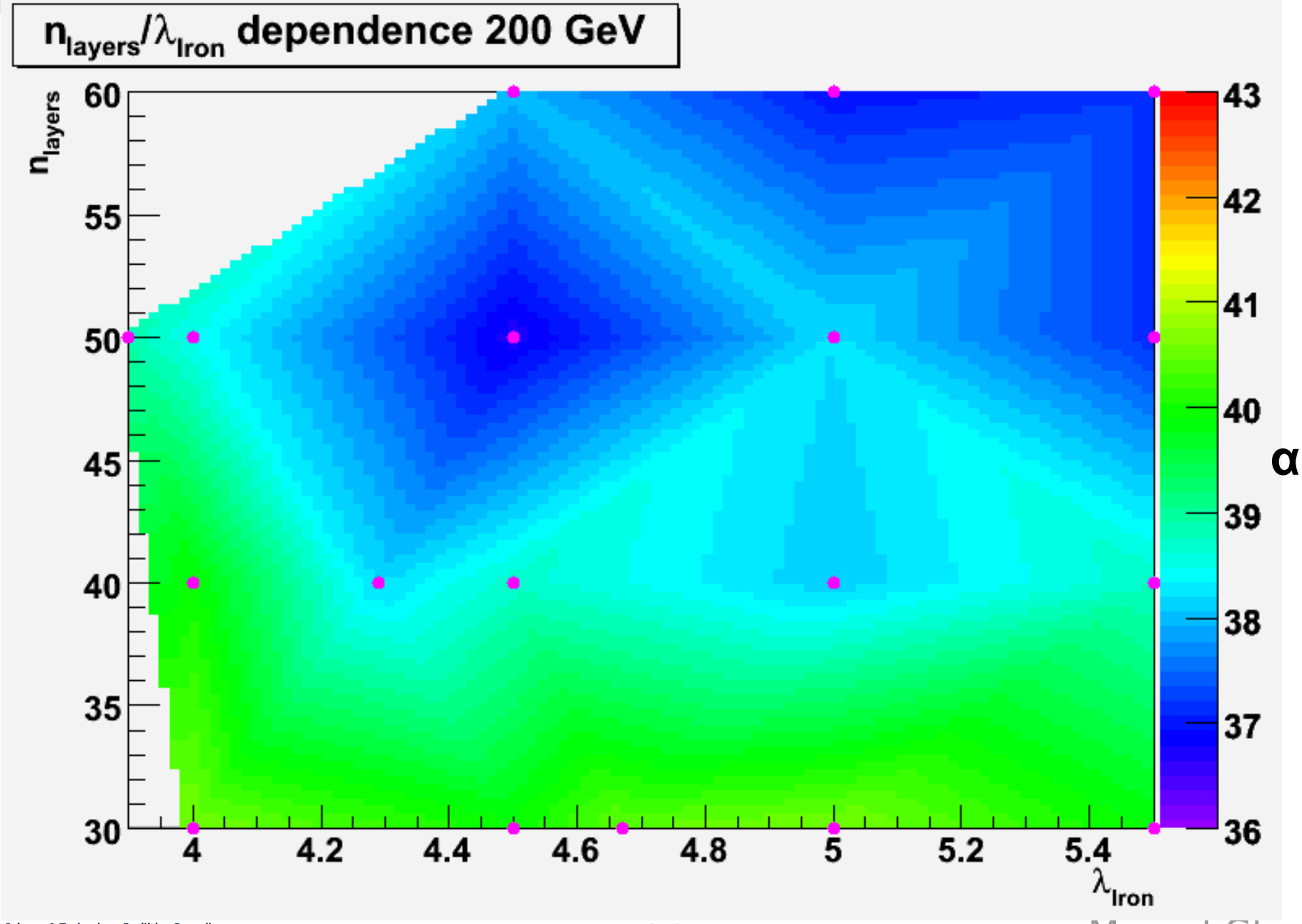


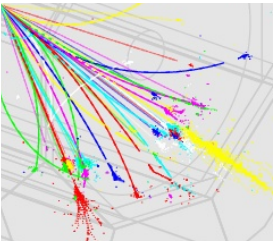
Putting things together





200 GeV


$n_{layers}/\lambda_{Iron}$ dependence 200 GeV
n_{layers}
60
55
50
45
40
35
30
4
4.2
4.4
4.6
4.8
5
5.2
5.4
λ_{Iron}
43
42
41
40
39
38
37
36
α



Remarks

- Fresh off the press and not all the points used yet
- Color interpolation done by ROOT ...
- Anyway, it seems to say
  - 50 layers 4.5 λ_{Iron} is a good place to be
- Will add the missing points
- For next week
  - try to parametrize response
  - confirm if $n_{Layers}/\lambda_{Iron} \sim 11$ is a good rule to use