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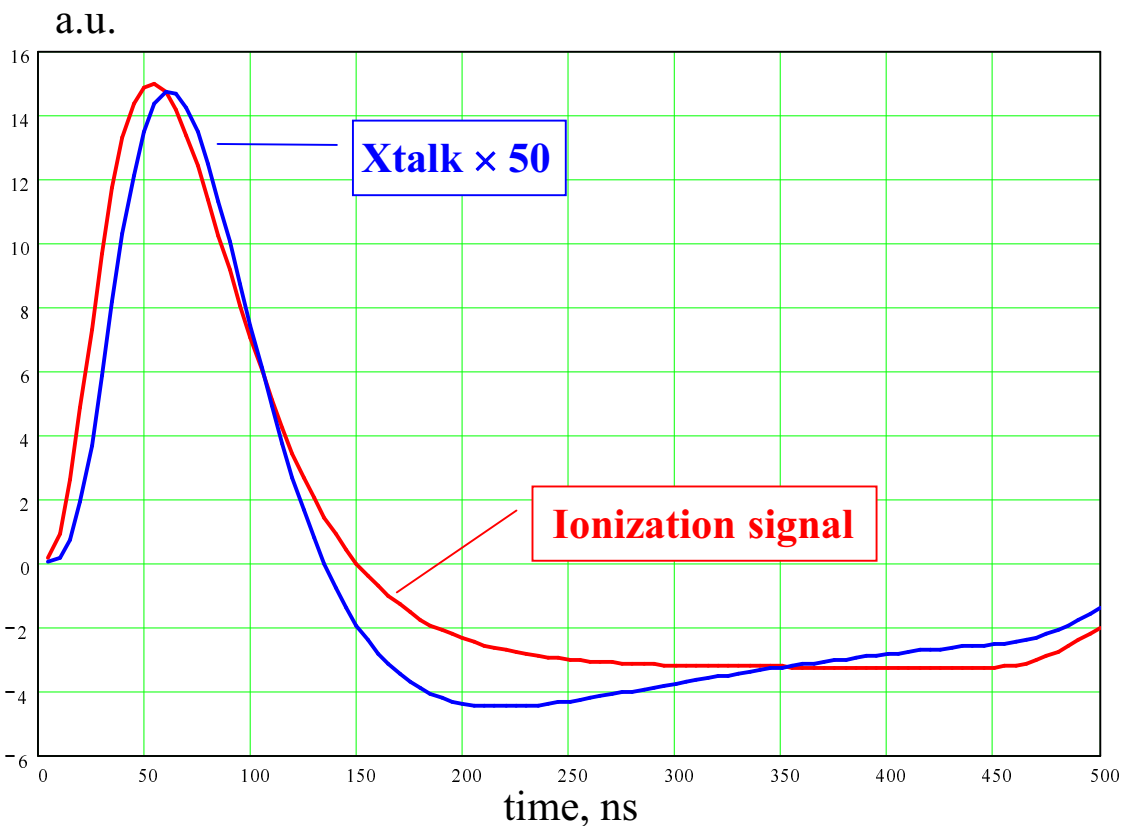
Xtalk of Electron and Muon Signals In Test Beam 1999

L.Kurchaninov, M.Levitsky

- **Xtalk predictions**
- **Electron runs**
- **Muon runs**
- **Conclusions**

Xtalk calculations

- Calculations presented in Dec.99 has been done for calibration signal (exponential), the estimation was that X≈2% for resistivity 0.5 MΩ/Sq and ≈1.1% for 1.0 MΩ/Sq
- New calculations for ionization signal (triangular) gives very close result. Example for 0.5 MΩ/Sq



- Xtalk signal has longer peaking time and bigger undershoot
- Xtalk amplitude: 1.97% for 0.5 MΩ/Sq and 1.14% for 1.0 MΩ/Sq

Comments to calculations

- Calculations give some underestimation of Xtalk because the Xtalk leakage from the signal is not taken into account. It can be done only for real pad geometry

- Inter-pad capacitive coupling is not taken into account. It increases the amplitude and changes the shape of the Xtalk signal

- Xtalk is measured as amplitude. In the experiment it is measured as the weighted sum of samples

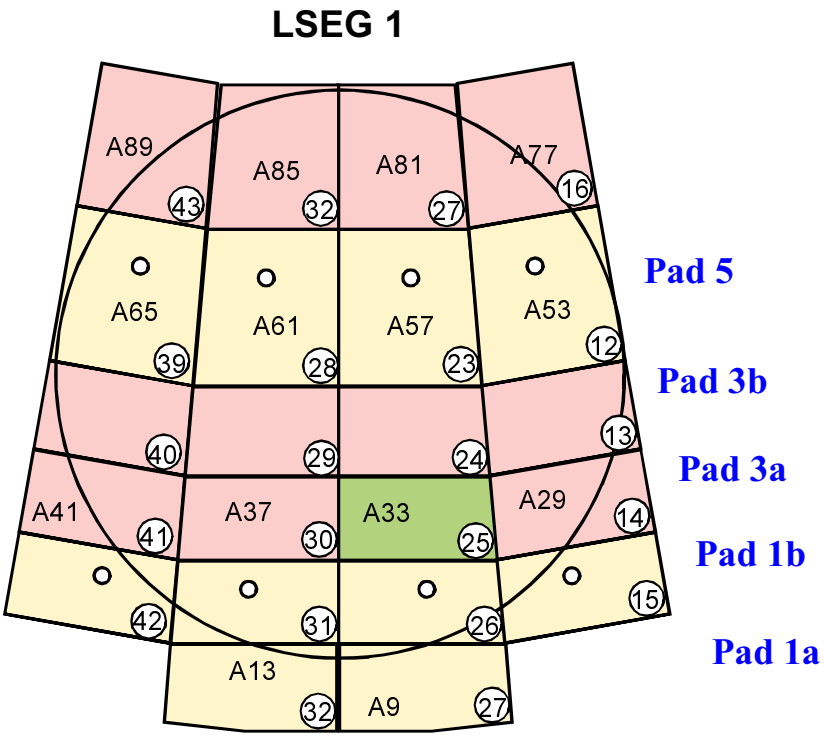
- In the case of calibration pulse, the real calibration shape (not the simple exponenta) has to be used

- Up to now the predicted Xtalk signals did not compare to the measured one

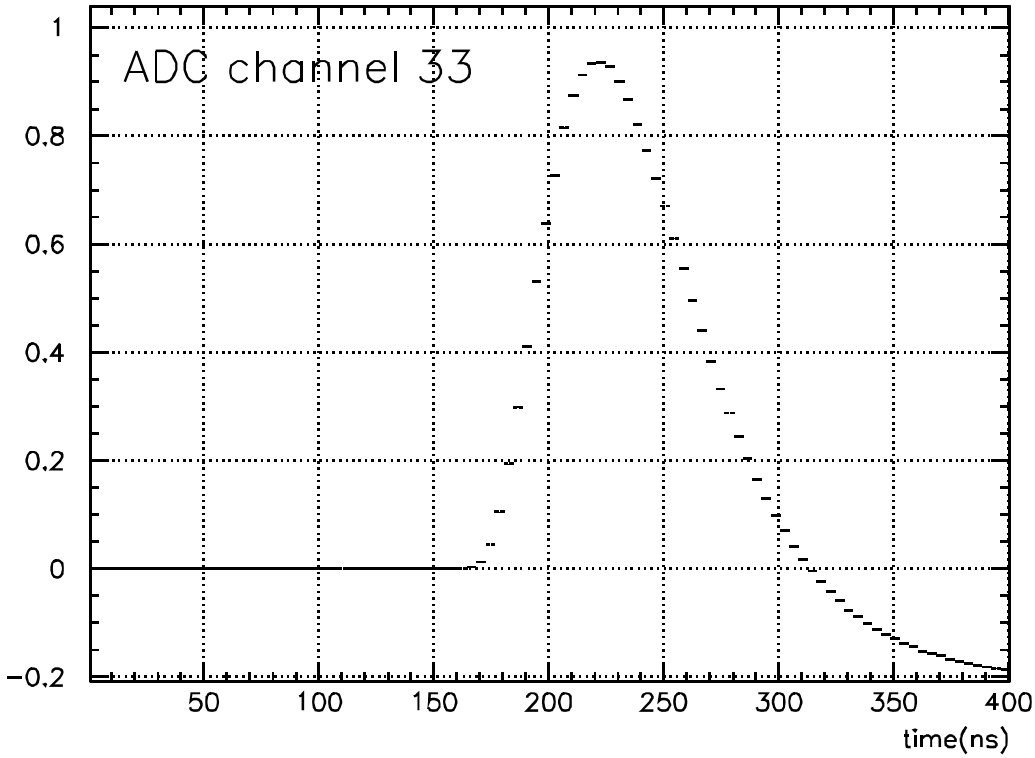
- So, for more precision, a new set of calcs (also for room temperature) and measurements is needed. This work will be done during and after the technical run

Electron signal

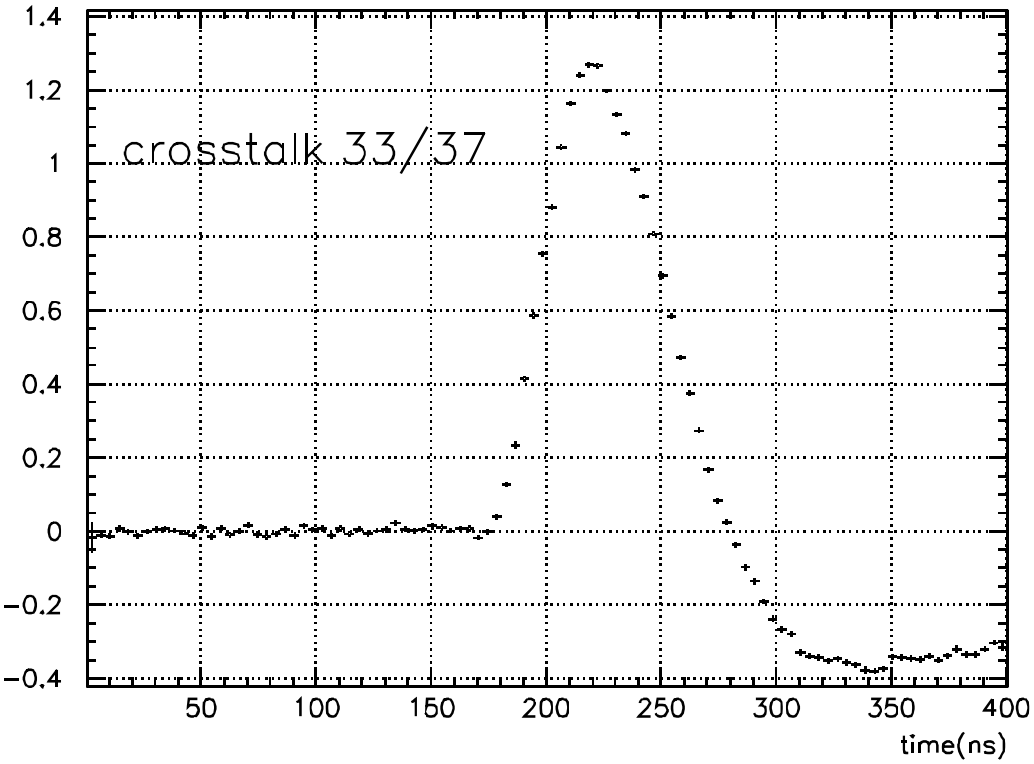
- Seg.1 in the beam region



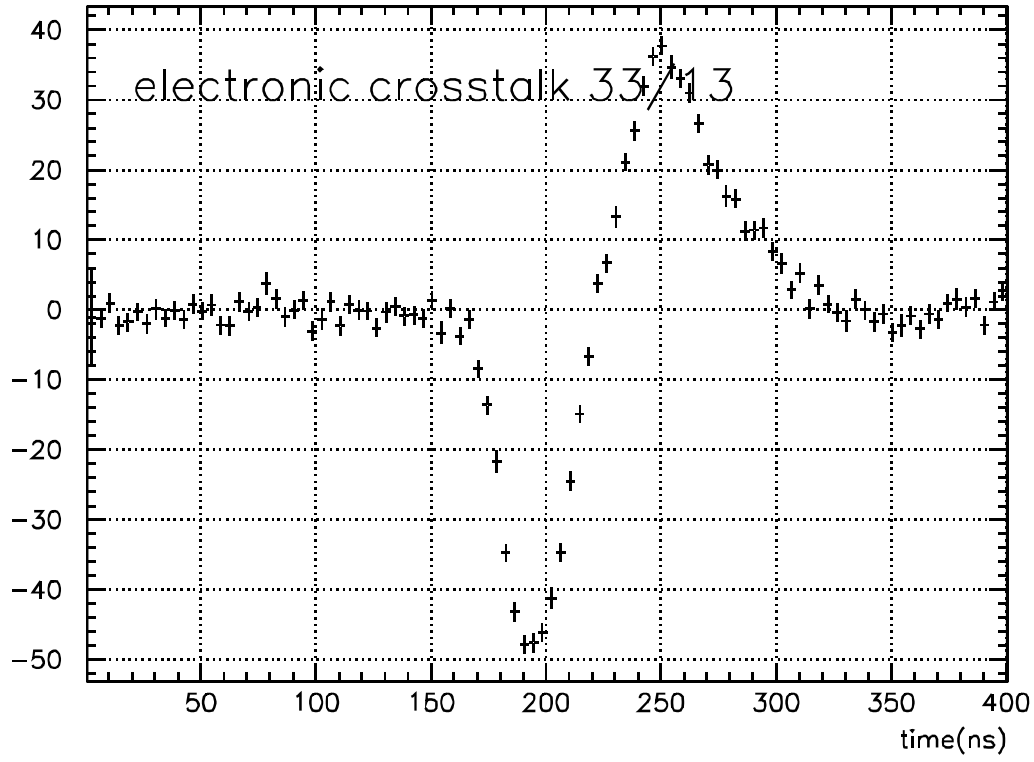
- Beam in the pad 3a (ADC 33)



- In the neighbouring pad 4a, 4b (ADC 37)

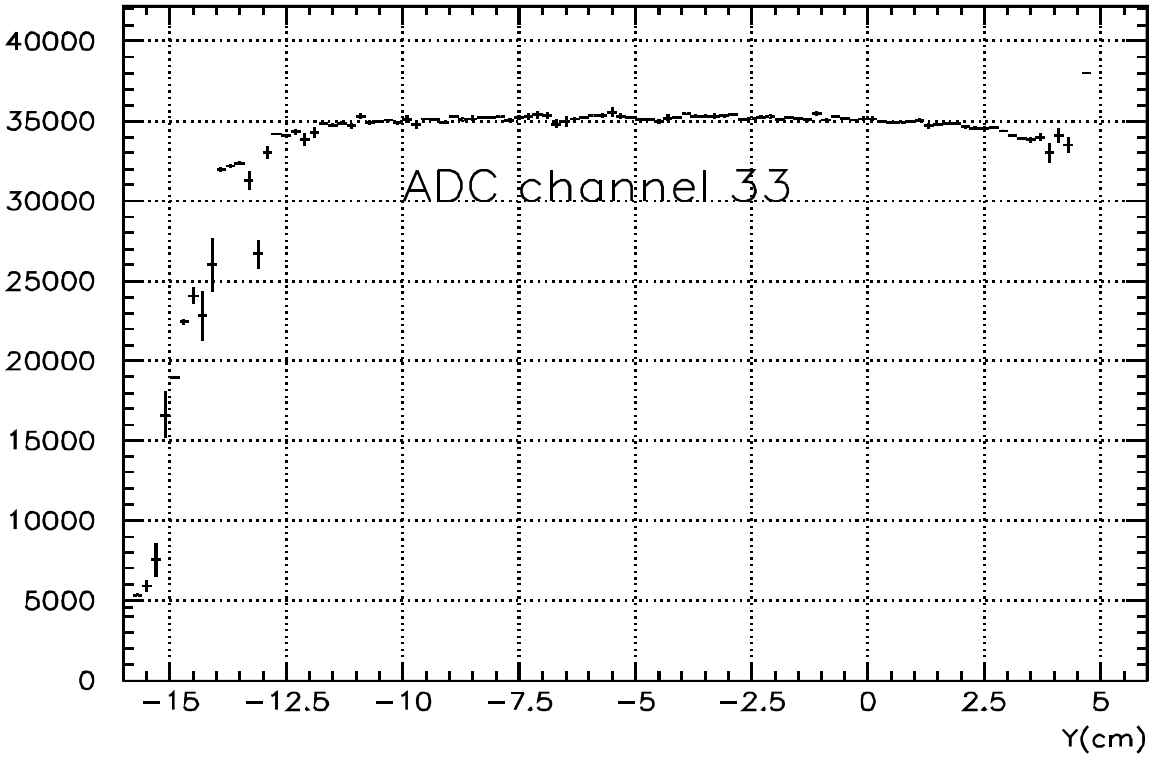


- At the same time in the diagonal pad 2a, 2b (ADC 13) X-talk is due to electronics only

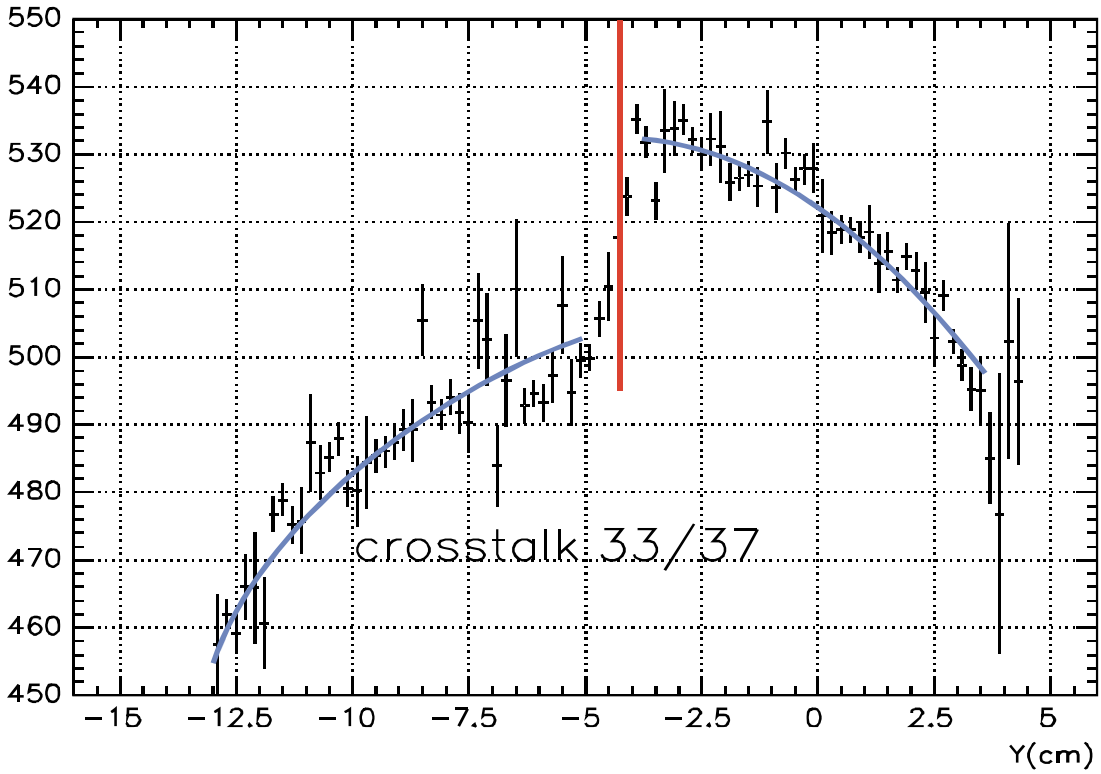


Electron Y-scan in the region of pad 3a-3b

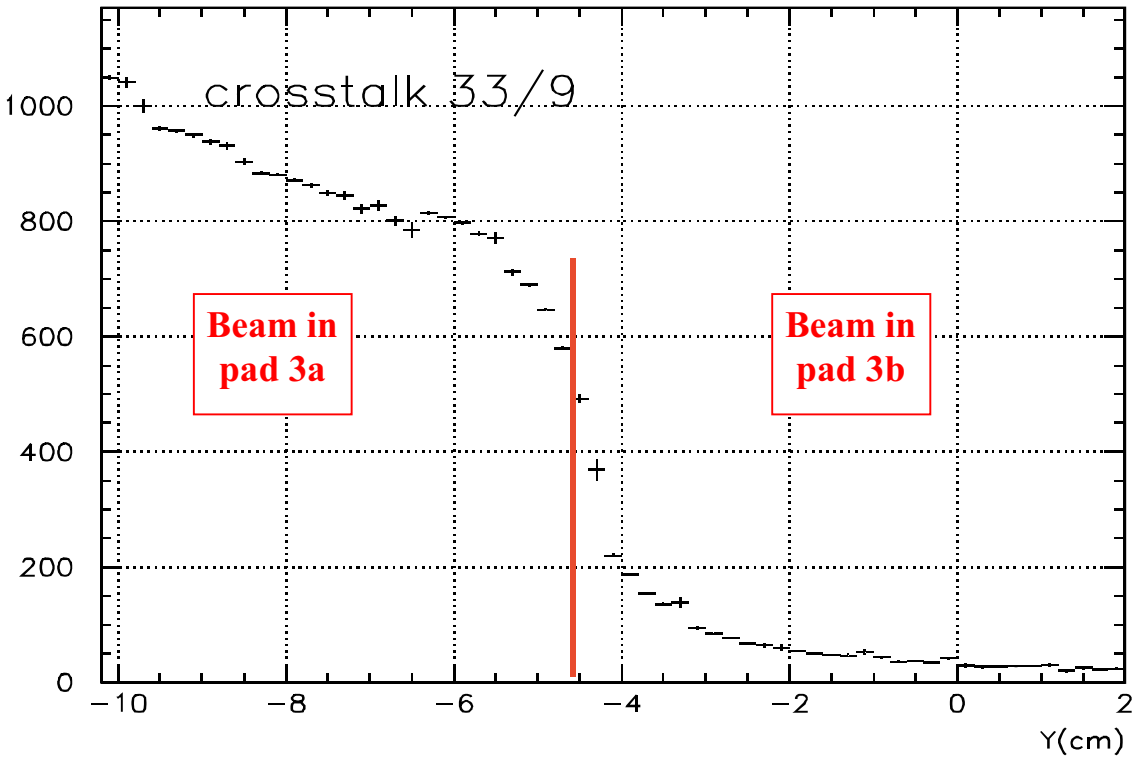
- Reconstructed amplitude (in nA) in ADC 33



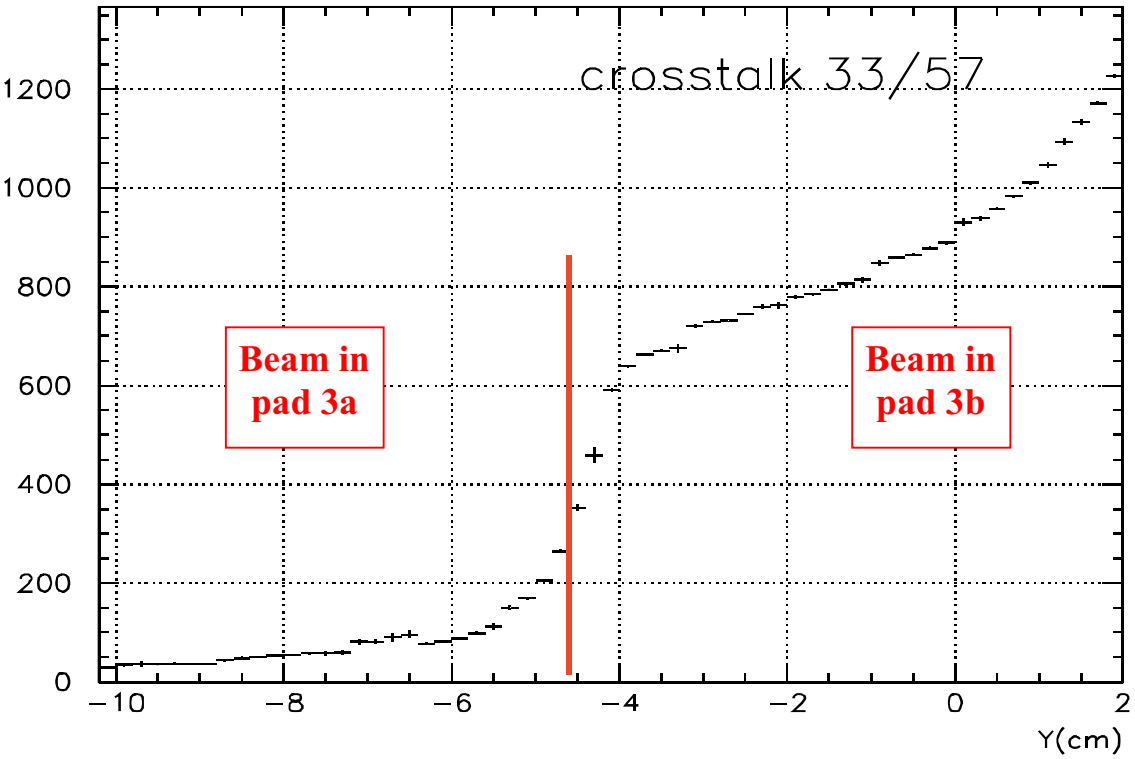
- Xtalk amplitude in the neighbouring pad ADC 37



- Xtalk amplitude (in nA) in the pad 1b (ADC 9)



- and in the pad 5 (ADC 57)



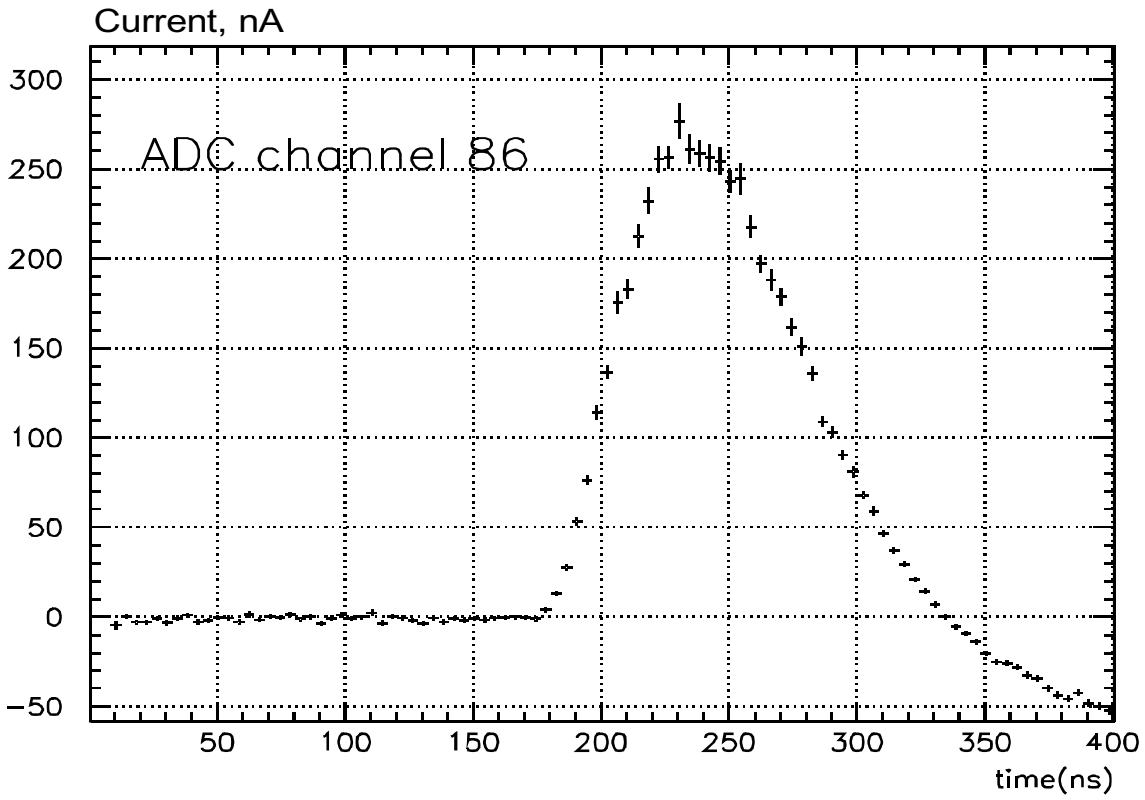
Summary for electron data Aug.99

148 GeV X scan Y = 13.4 cm (runs 8375-8424)
150 GeV Y scan X = 8 cm (runs 8570-8601)

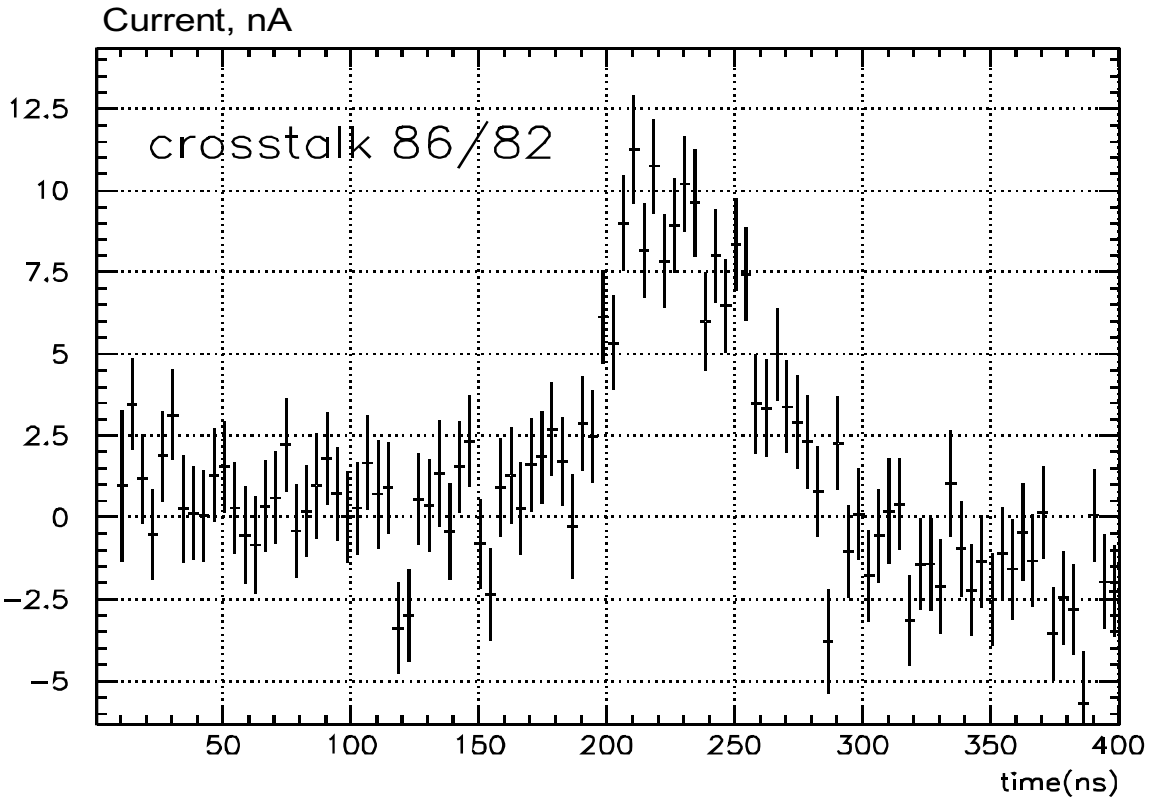
MODULE 3		MODULE 2		MODULE 1	
	89 65: 2.1%	**85** 61: 2.4% 57: 0.06%	**81** 57: 2.6% 61: 0.10%	**77** 53: 1.7%	
69 65: 2.1%	**65**	**61** 57: 2.3%	**57** 61: 2.7% 33: 2.8%	**53**	**49** 53: 1.9%
	41 65: 2.3%	**37** 61: 2.7% 33u: 1.5%	**33** 57: 2.8% 61: 0.08%	**29** 53: 1.9%	
		33d: 1.4%			
		13	**9** 33d: 2.2%		

Muon signal

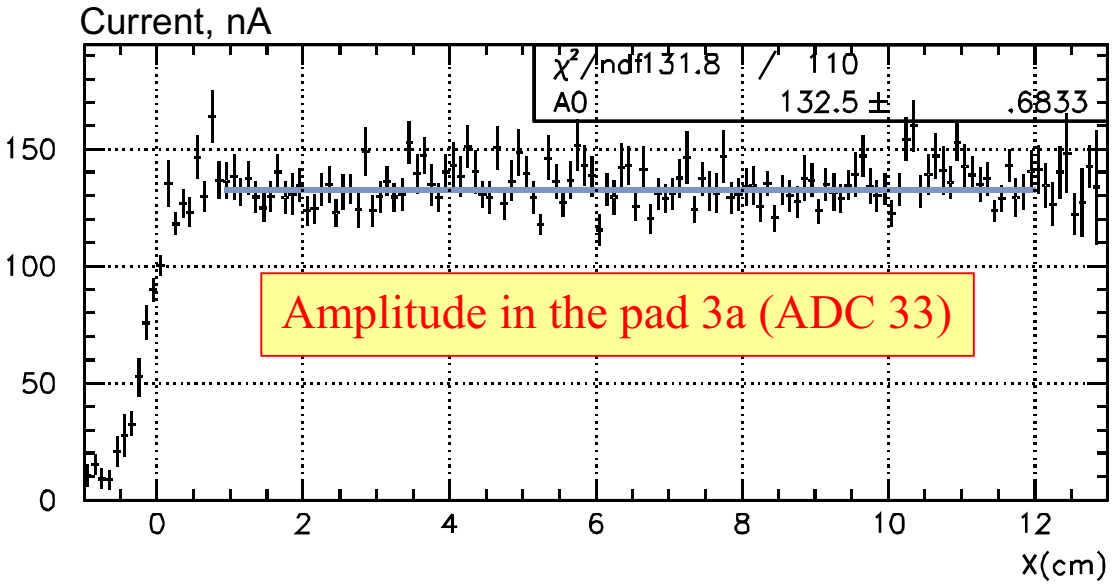
- Muon signals are very low, so the accuracy is not good. Seg.2, pad 8:

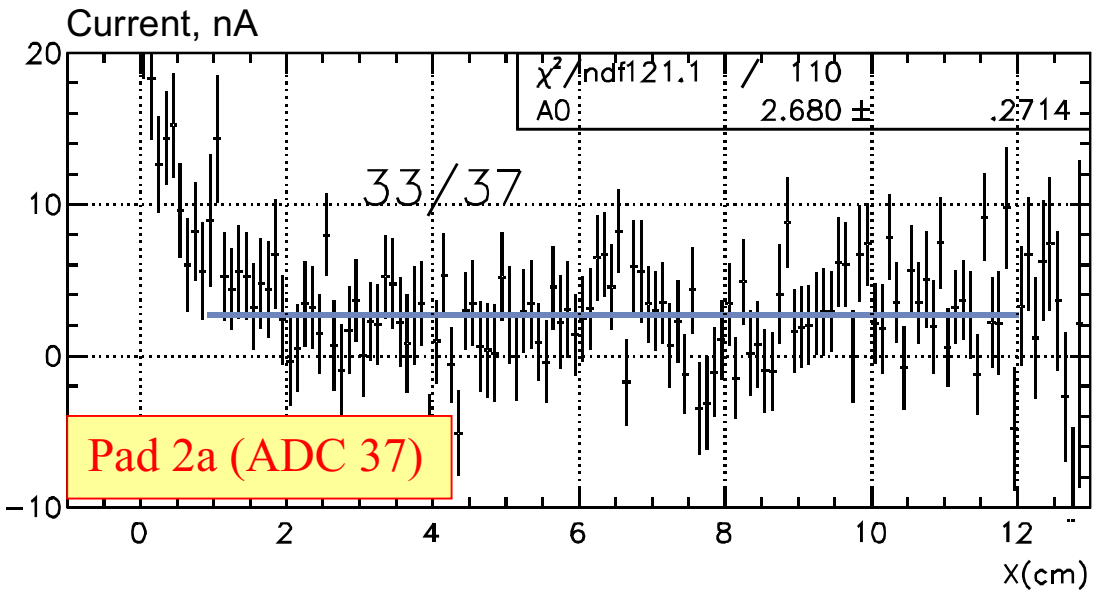


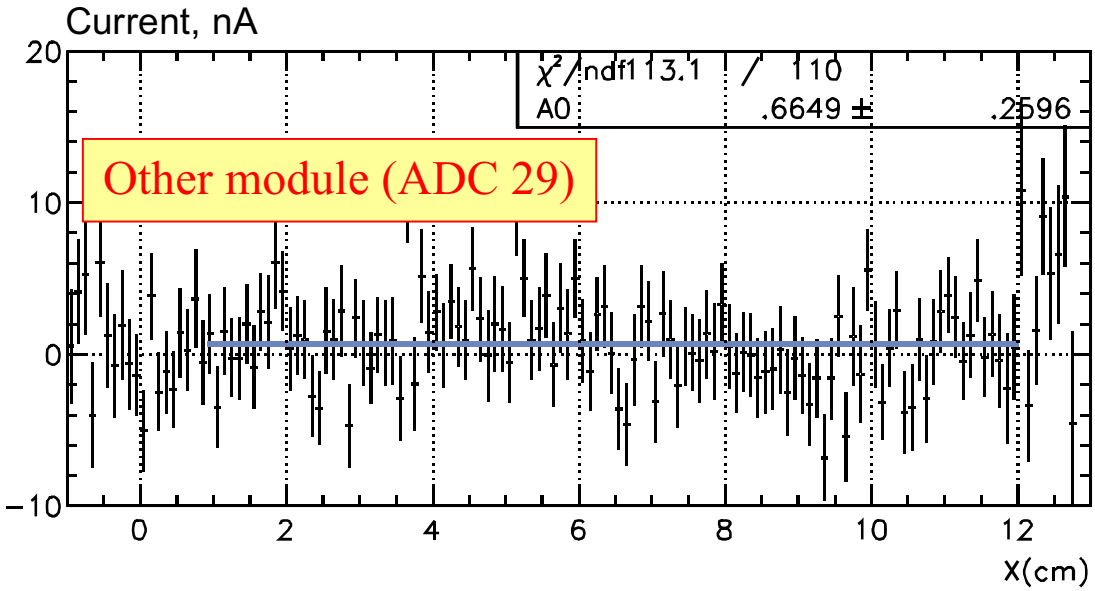
- Xtalk in the neighbour pad 7 (ADC 82)



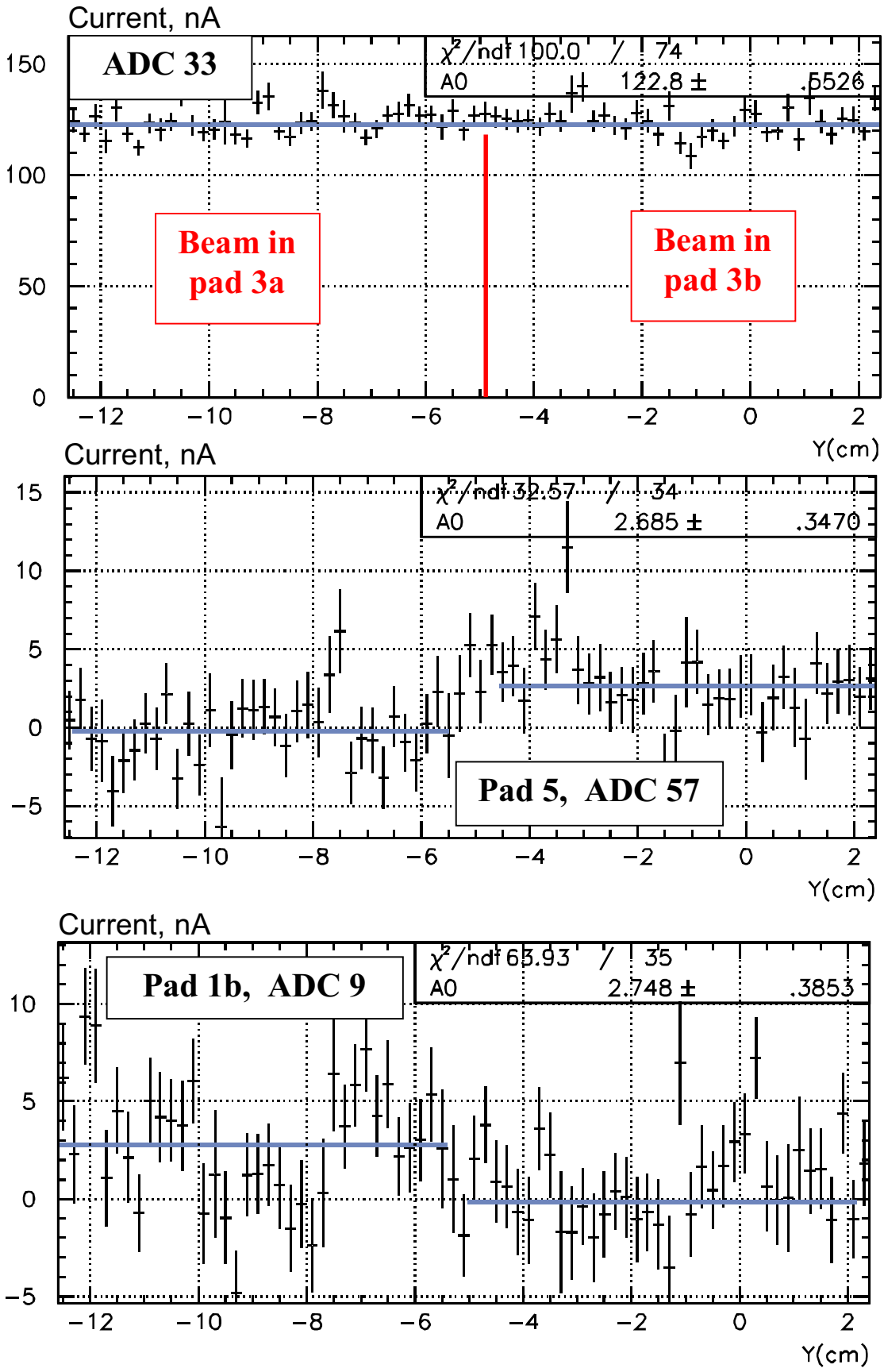
Muon X-scan in the region of pad 3a







Muon Y-scan in the region of pad 3a-3b



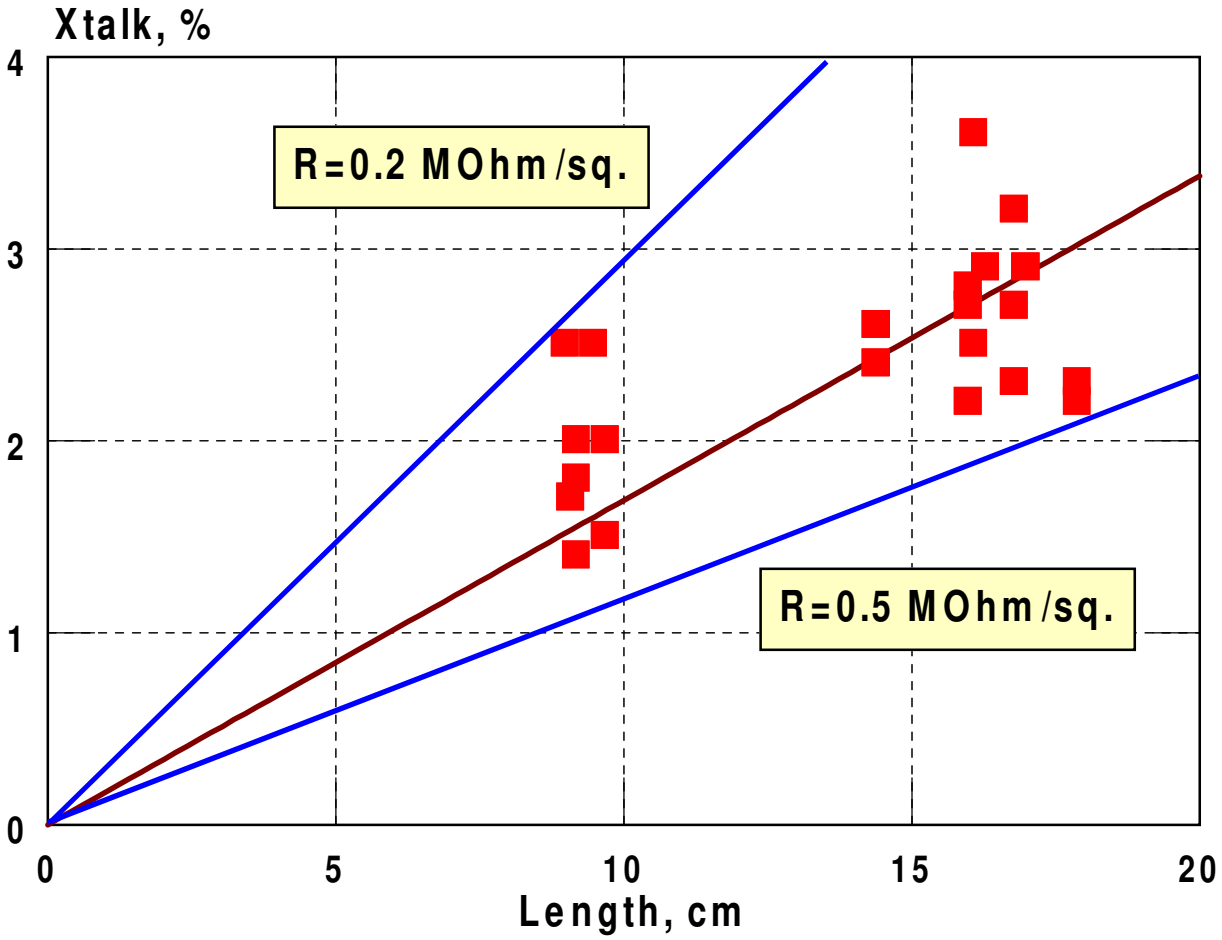
Summary for muon data Aug.99

120 GeV X scan Y = 13.4 cm
120 GeV Y scan X = 8 cm
200 GeV X scan Y = -4.5 cm

SEGM	ADC	PAD	X,%
1	57→61	5→6	3.2
	33→37	3a→4a	2.0
			1.8
	33→9	3b→4b	2.0
			1.5
		3a→1b	1.9
			2.3
	33→57	3b→5	2.2
2	82→86	7→8	2.9
	58→62	5a→6a	2.5
		5b→6b	2.5
	58→82	5b→7	3.6
			2.5
	58→34	5a→3b	2.9
	58→62	5ab→6ab	1.7
3	107→111	9→10	2.8
	83→87	7a→8a	2.2
		7b→8b	2.2
		7ba→8ba	2.1
	83→107	7b→9	2.3
	83→59	7a→5b	2.7
4	132→136	11→12	2.4
	108→112	9→10	2.8
	108→132	9→11	4.3

Xtalk vs. boundary length

- Xtalk is proportional to L for the fixed resistivity
- All data (e and μ) for the front module:



- Comparison to theoretical estimation gives R = 0.2—0.5 MΩ/Sq (see “comments”)

Conclusions

- Precise theory has to be developed
- Xtalk measurements during the technical run
- Electron data: Xtalk vs. position is not clear
- Muon data: accuracy of measurement is bad
- On qualitative level: xtalk shape looks reasonable, value corresponds 0.2 – 0.5 MΩ/Sq