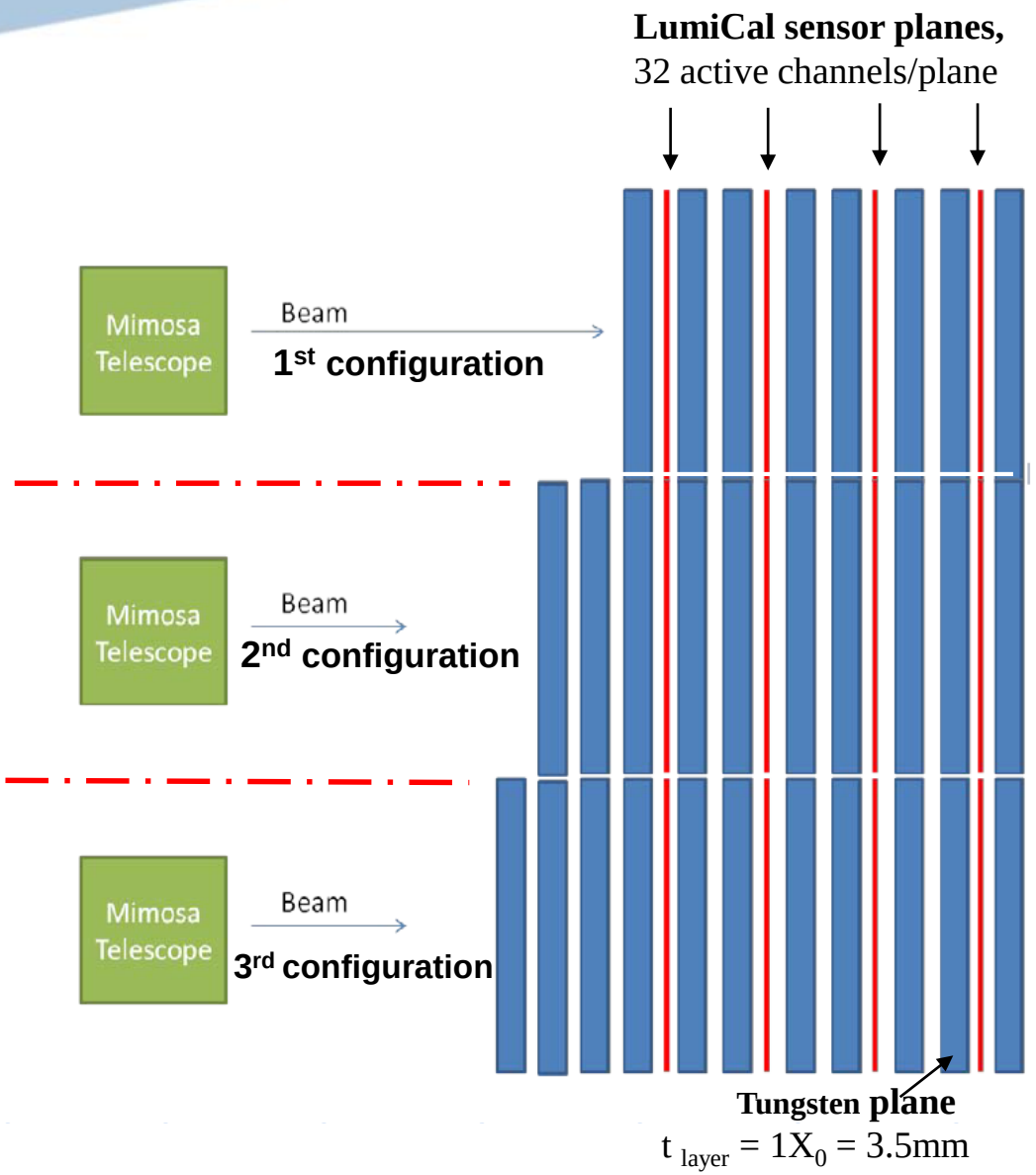
TB final shower development analysis at ISS

Veta Ghenescu*, Titi Preda*

**Institute of Space Science, Bucharest, Romania*

Set-up configuration

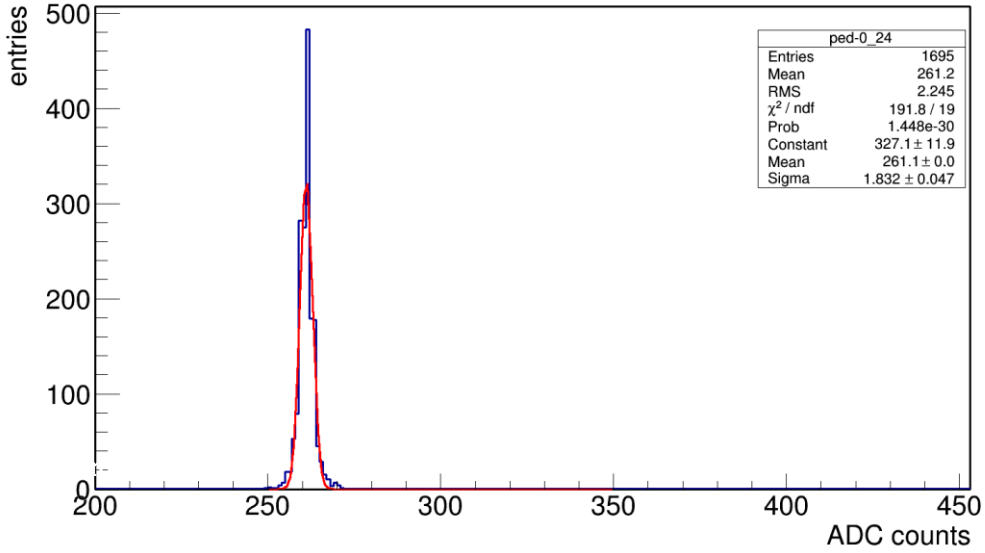
Plane number in eudaq file	Board ID	Plane order number
0	63	0
1	67	2
2	76	3
3	64	1



Signal selection

Gain = 2 for channels:

- **4, 5, 6, 7**
- **12, 13, 14, 15**
- **20, 21, 22, 23**
- **28, 29, 30, 31**



- **For every sample, $0 \leq sam < 32$**

$$ADC_{sam} = i\_data[sam] - \langle Ped \rangle_{ch} \quad ch \in [0, 31]$$

$$ADC_{sam} \geq 4 * sigma \qquad (1)$$

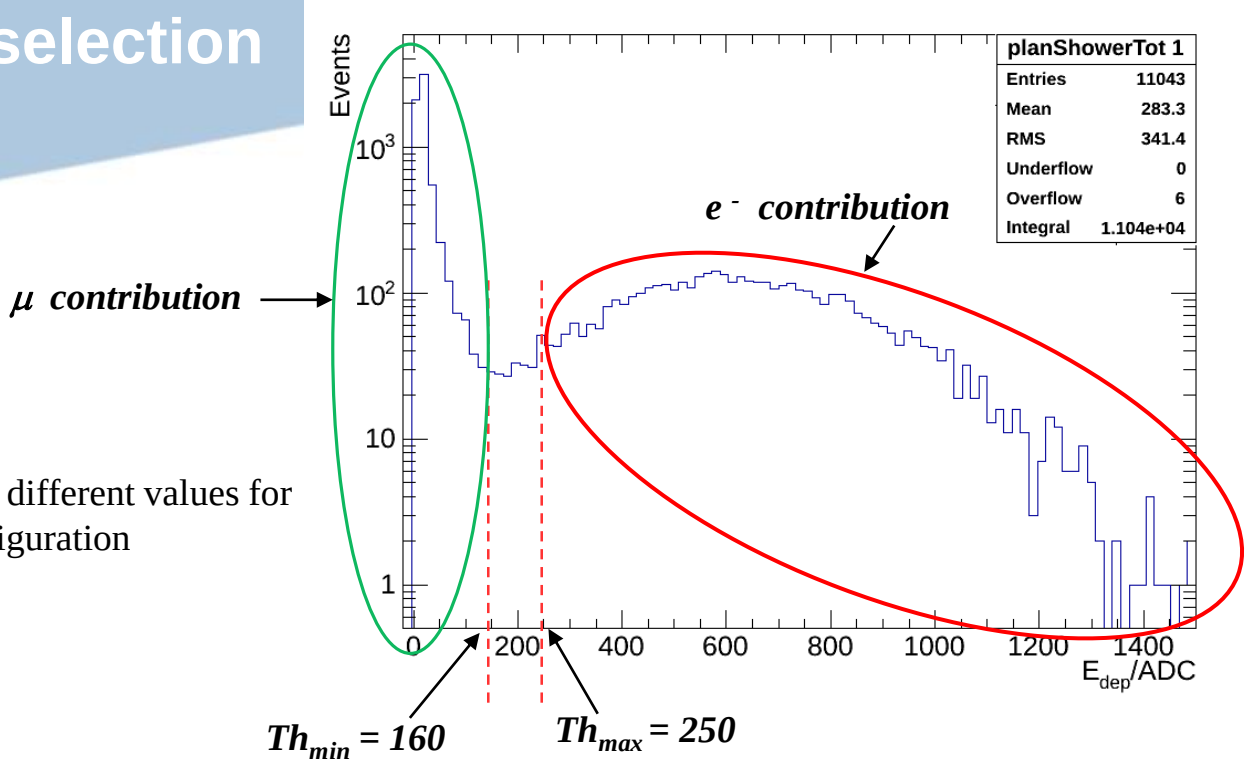
- **For every channel and sensor plane**

$$Signal_{ch} = MAX(ADC_{12}, \dots, ADC_{sam}, \dots, ADC_{25}), \quad sam \in [12, 25]$$

$$\langle Signal_{pl} \rangle = \frac{\sum_{ch=0}^{31} Signal_{ch}}{N_{ev}} \qquad (2),$$

where: N_{ev} – number of events which satisfy eq. 1

Signal selection



***Th* = *ADC threshold* -** has different values for each sensor plane and configuration

- ***For electron beams - no cut was done***

$$S_e(plane) = \langle Signal \rangle \qquad (1)$$

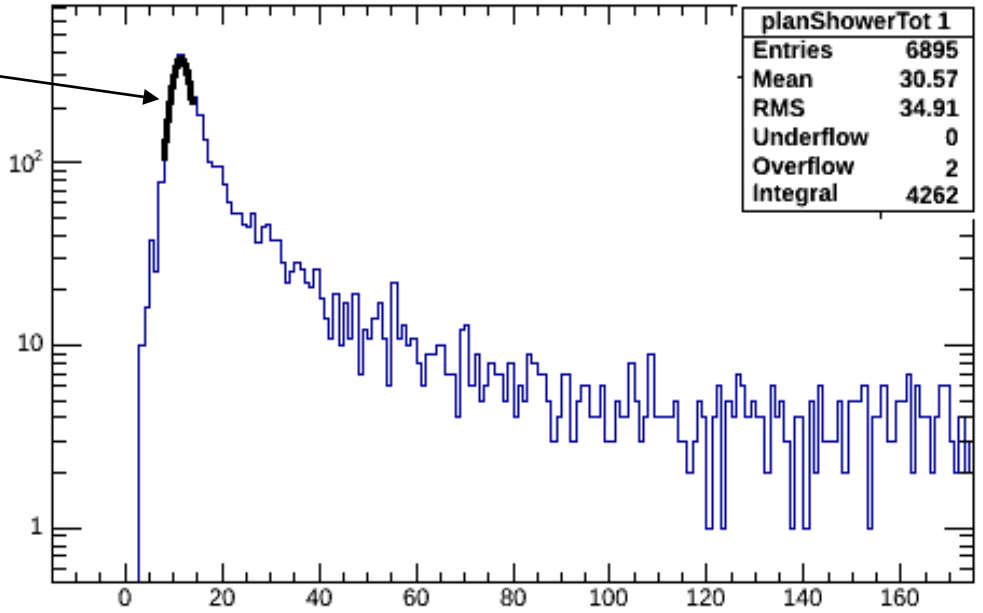
- ***For runs with the beam composed from electrons and muons, two cuts were done:***

$$S_{e,\mu}(plane) = \langle Signal \rangle > Th \qquad (2)$$

$$\langle Signal \rangle = \frac{S_{cut\_min} + S_{cut\_max}}{2} \qquad (3)$$

shower development

Gauss fit



Board ID	Sensor plane number	MIP-peak [ADC]
63	0	11.0275
64	1	11.4568
67	2	11.2622
76	3	11.9206

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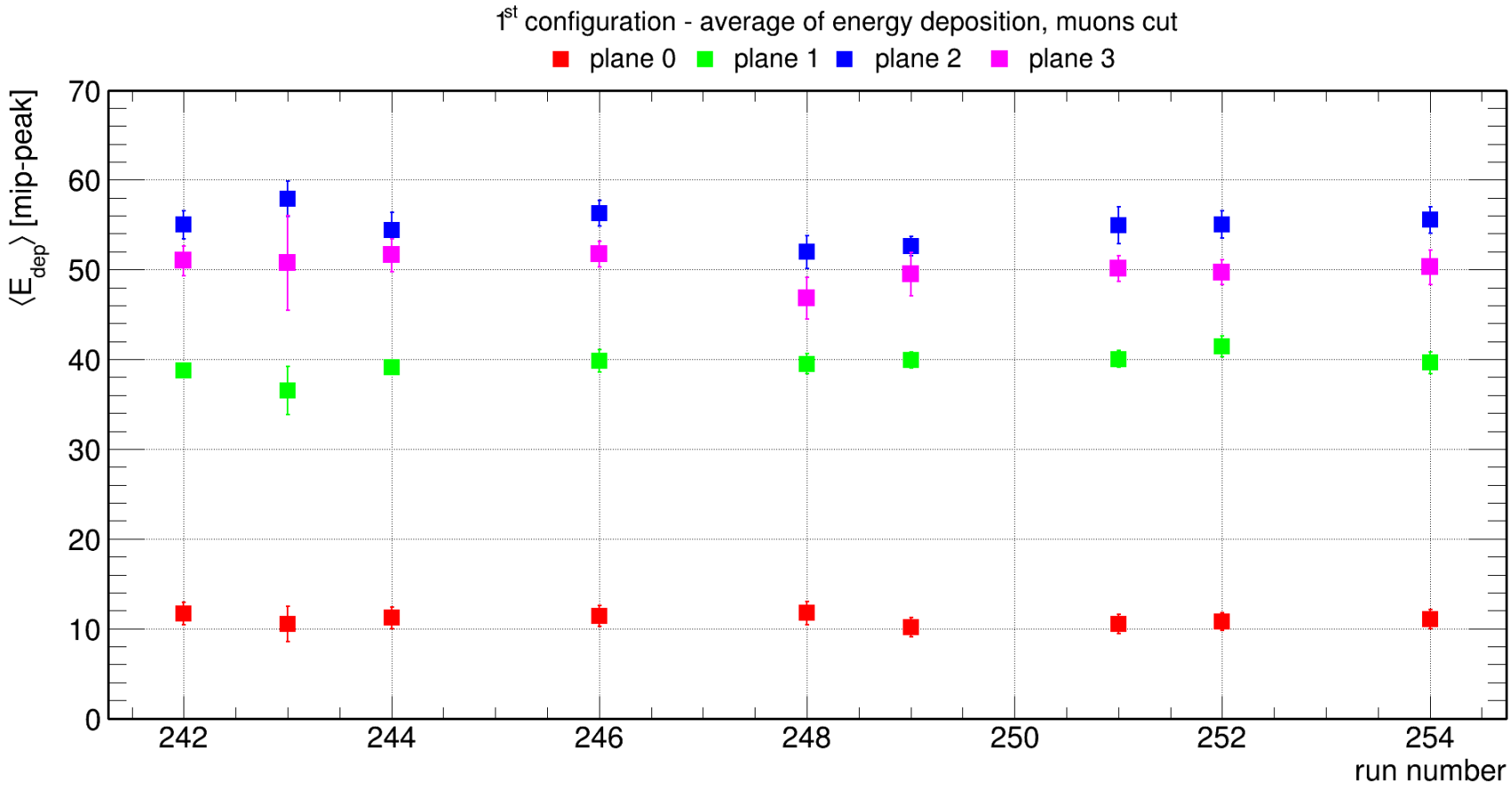
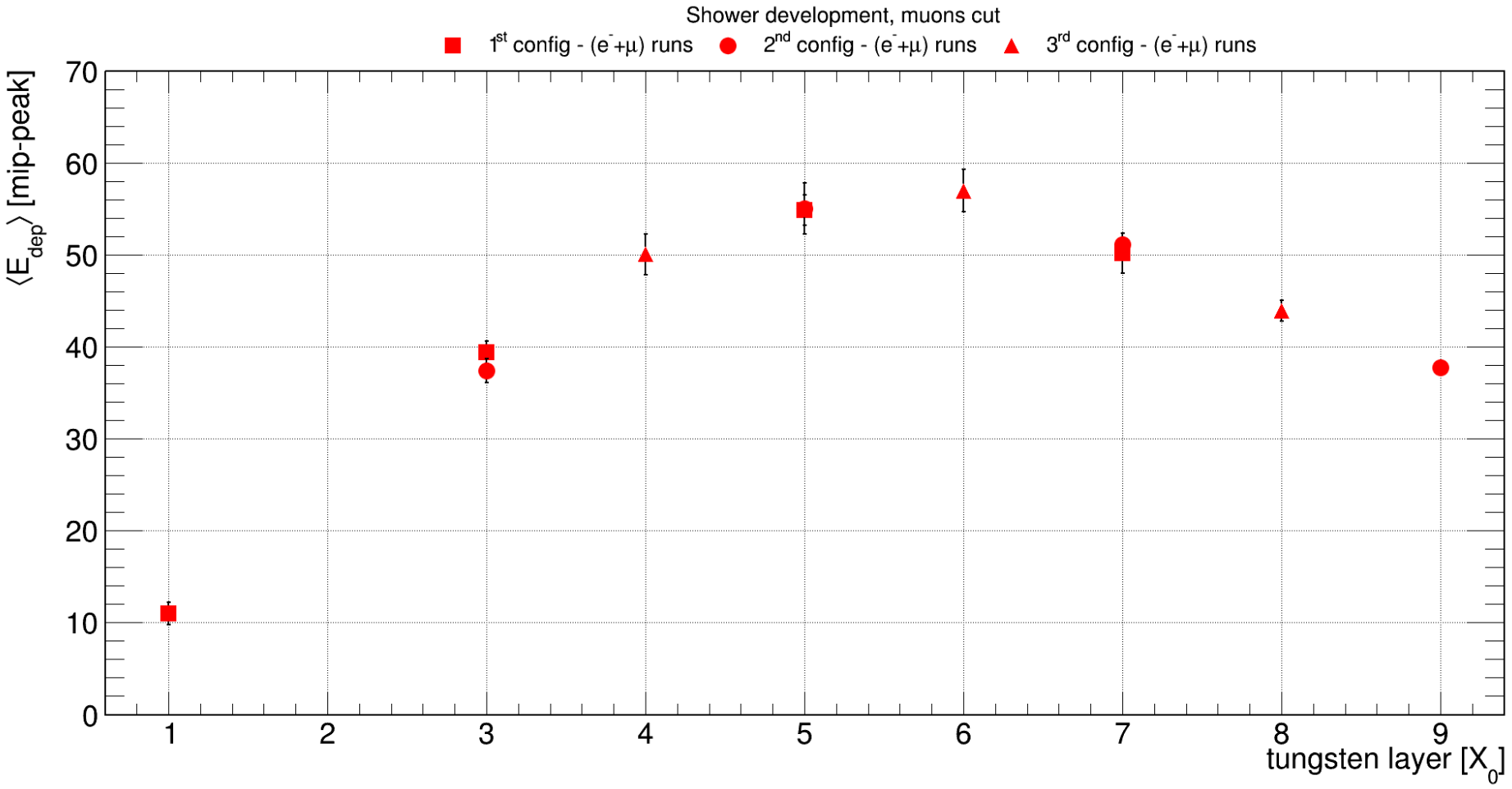


The error bars represent the systematic uncertainties!

shower development



The error bars represent systematic uncertainties!

shower development

Configuration	Board ID	Sensor plane	Radiation length [X_0]	$\langle E_{dep} \rangle$ [MIP-peak]	Systematic errors [MIP-peak]
1	63	0	1	10.995	1.235
	64	1	3	39.420	1.22
	67	2	5	54.845	1.655
	76	3	7	50.145	2.195
2	63	0	3	37.385	1.285
	64	1	5	55.005	2.755
	67	2	7	51.09	0.78
	76	3	9	37.74	0.43
3	63	0	4	50.03	2.2
	64	1	6	56.955	2.325
	67	2	8	43.94	1.13

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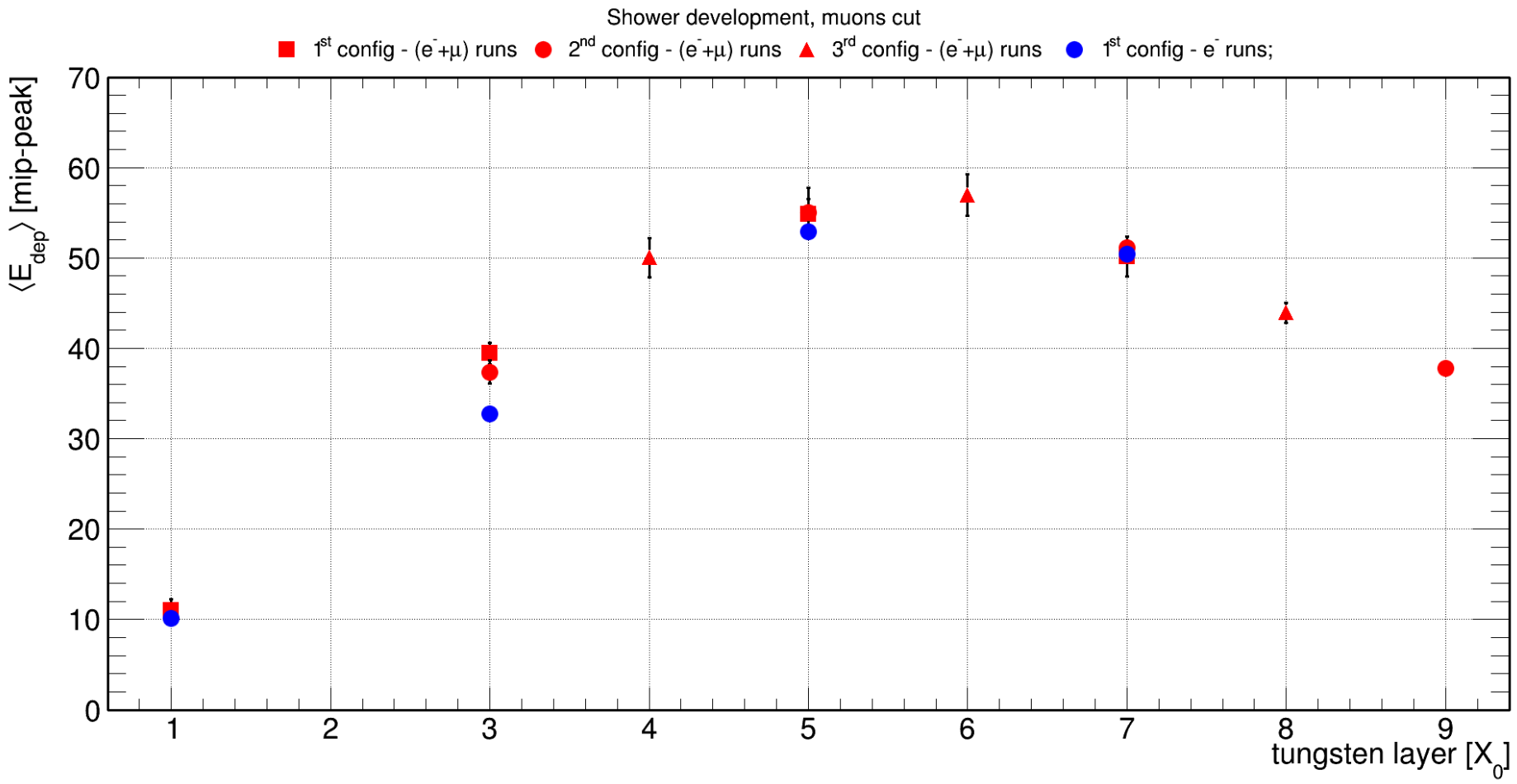

Conclusions

- **We improved the maximum method for signal analysis for each trigger taking into account abroad large sample range;**
- *electrons* **and** *muons* **discrimination method by cuts worked well with pretty small systematic errors;**
- **The average value of the energy deposition doesn't depend of the binning spectrum;**
- **The runs of** *muons&electrons* **and** *electrons* **give almost the same values of the e^- energy deposition;**
- **The energy** *electrons* **deposition is stable in time;**