

EXP2003 - Developing #445

Pre-beam calibrations - side telescope

03/31/2020 08:50 AM - Vratislav Chudoba

Status:	Открыта	Start date:	03/31/2020
Priority:	Нормальный	Due date:	
Assignee:	Ivan Muzalevsky	% Done:	100%
Category:		Estimated time:	0.00 hour
Target version:			
Description			
Provide a description of calibration measurement related to side telescope which was performed before the beginning of the beam session.			
Provide calibration parameters to be used for express analysis for both silicon detectors employed in the side telescope.			

History

#1 - 03/31/2020 10:31 AM - Ivan Muzalevsky

- File *pedestals.txt* added
- File *sq20_front.cal* added
- % Done changed from 0 to 100

First of all the second layer 1-mm SSD was calibrated with the http://er.jinr.ru/git/komyour/calibration_one_spectrum. Data for 1-mm calibration:

ati.jinr.ru:/data/clb/crun_01*

In the measurement the source was located in front of the 20um-1mm telescope, at the normal line, in ??? cm from the thin detector plane. The distance between detectors was ??? mm

Then, the thin detector was calibrated, using the data from the measurement where the thin detector was located in from of the 1-mm SSD.

ati.jinr.ru:/data/clb/crun_03*

First of all the positions of the pedestals of all strips of the thin detector were obtained. The pedestal position was calculated from the amp distribution with the condition if there were no time signal in the corresponded strip. The pedestal values were calculated as:

$\text{pedestal}[i](\text{channels}) = \text{MEAN}[i] - \text{FWHM}[i],$

of these distributions. Then the spectrum of the thin amplitudes was shifted by those pedestal position values.

For both 1-mm and 20-um detectors, the multiplicity selection by the time-threshold was applied.

Then, in the 1-mm SSD spectra the signals caused by an alpha particle with energy 7.68 MeV were selected (shown at the following fig):

JrUDcYQ6hmo.jpg

We assume (from the previous experience) that the **total summed** dead layer between the source and the 1-mm sensitive part is ~3.5um for the purpose of this calibration. Assuming such a dead layer, one should expect that the Edeposite of the alpha particle with initial energy 7.6869 MeV in all sensitive volumes should be ~7.3 MeV.

The energy deposits in the thin detector strips were calculated as

$$eShift[i] = 7.3 - eDep_1mm[i].$$

In the following picture the spectra from the 20-um detector caused by the 7.68 MeV alpha are presented.

VFMHz0siEkc.jpg

The positions of the green peaks (position[i]) were obtained by gauss fitting.

The linear calibration parameter of the 20um detector was obtained as:

$$a[i] = position[i]/eShift[i].$$

The free coefficient b[i] was obtained as the

$$b[i] = -pedelstal[i]*a[i].$$

Calibration parameters are written in the sq20_front.cal

The spectra summed from both SSDs:

Screenshot%20from%202020-03-31%2010-29-12.png

Files

pedestals.txt	128 Bytes	03/31/2020	Ivan Muzalevsky
sq20_front.cal	329 Bytes	03/31/2020	Ivan Muzalevsky