

EXP1803 - Analyzing #207

Analyzing # 183 (Открыта): Express analysis of experimental data

Particle identification plot for left telescope

07/06/2018 04:04 PM - Vratislav Chudoba

Status:	Открыта	Start date:	07/14/2018
Priority:	Высокий	Due date:	
Assignee:	Vratislav Chudoba	% Done:	100%
Category:	Software	Estimated time:	0.00 hour
Target version:			
Description			
Identification of particles using dE-E plot is difficult because of unclarity related to thin detector thickness.			
Preliminary map of thickness obtained in task 198 have to be taken into account.			
Subtasks:			
Developing # 215: Telescope track reconstruction			Закрота

History

#1 - 07/06/2018 09:42 PM - Vratislav Chudoba

Analysis of the ^6He beam data

For convenience, we show uncorrected part of dE-E plot as shown in [task 186](#).

leftT_uncorrected.gif

Uncorrected dE-E plot cutted for Z=4 group. Shown statistic for strip 11 (7th panel) is ~29000.

If we employ correction for thickness inhomogeneity used in [task 186](#), we obtain dE-E diagrams with slightly lower statistics. We recall that we applied the assumption of parallel flux of particles hitting the left telescope as the first approximation. We supposed that particles are hitting the both detectors in direction perpendicular to their surface.

leftT_corrected_1stApp.gif

1st correction of dE energy losses for inhomogeneity of the thin detector. We observe some change of the hyperbolae quality, we see effect of correction in equalization of dE (corrected) at given overall energy deposit. Shown statistic for strip 11 (7th panel) is ~20000.

In above figures, we may observe some indication that quality of the hyperbolae was not strongly changes after 1st correction. We try to use the correction of the thickness taking into account the direction of the particle hitting the telescope. We constructed trajectory given by two points:

1. calculated projection of the beam particle at target plane; the real rotation of the beam was not taken into account; target plane was given by $z=0$;
2. calculated location of the hit in 1 mm left detector; the distance from target center to detector was taken as 230 mm; the detector offset was not taken into account;

The intersection with thin detector plane (assumed at distance 176.4 mm from target plane) was calculated and X and Y coordinates in thin detector were determined. The thickness at intersection of particle trajectory with thin detector plane was used for dE correction. The offset of thin detector (preliminary established in [task 199](#)) was not taken into account. The angle of particle trajectory to detector surface was very near to normal and was not taken into account.

We were able to use only very restricted number of events for the second approximation of thickness correction

- reasonable projection of beam projection at target plane (demanding e.g. the multiplicity equal to 1 at all MWPC's);
- reasonable calculated trajectory of particle hitting left telescope;
- all suspicious strips were switched off;
- strips multiplicity in 1 mm detector equal to 1;

and for that reason we observe only very limited statistics. For example the statistics in thin detector strip No. 11 is descending in following way:

~29000 events (uncorrected) --> ~20000 events (first correction) --> ~9500 events (second correction).

leftT_corrected_2ndApp.gif

2nd correction of dE energy losses for inhomogeneity of the thin detector. We suppose that hyperbolae quality is much better than in previous two cases. Shown statistic for strip 11 (7th panel) is ~9500.