

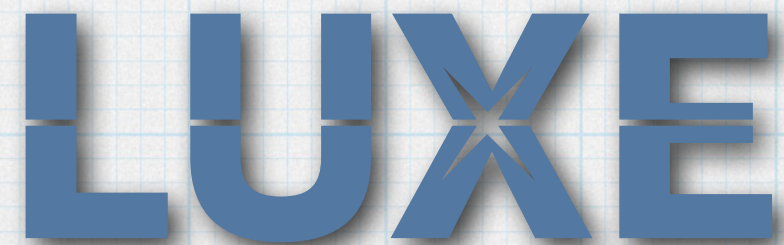
Gamma Monitor using backscatters

Borysova Maryna (KINR)

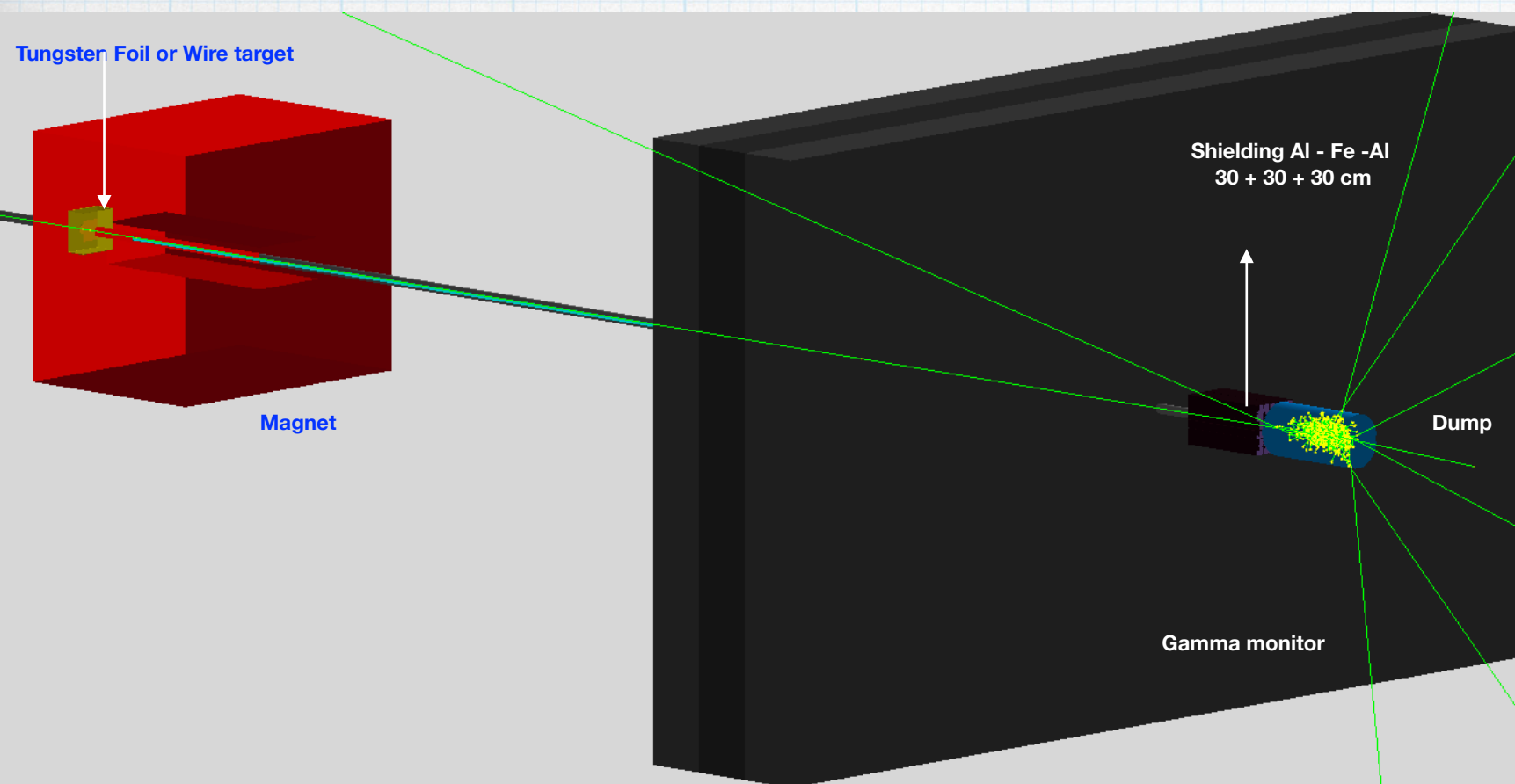
LUXE technical meeting

DESY Hamburg

7/05/20

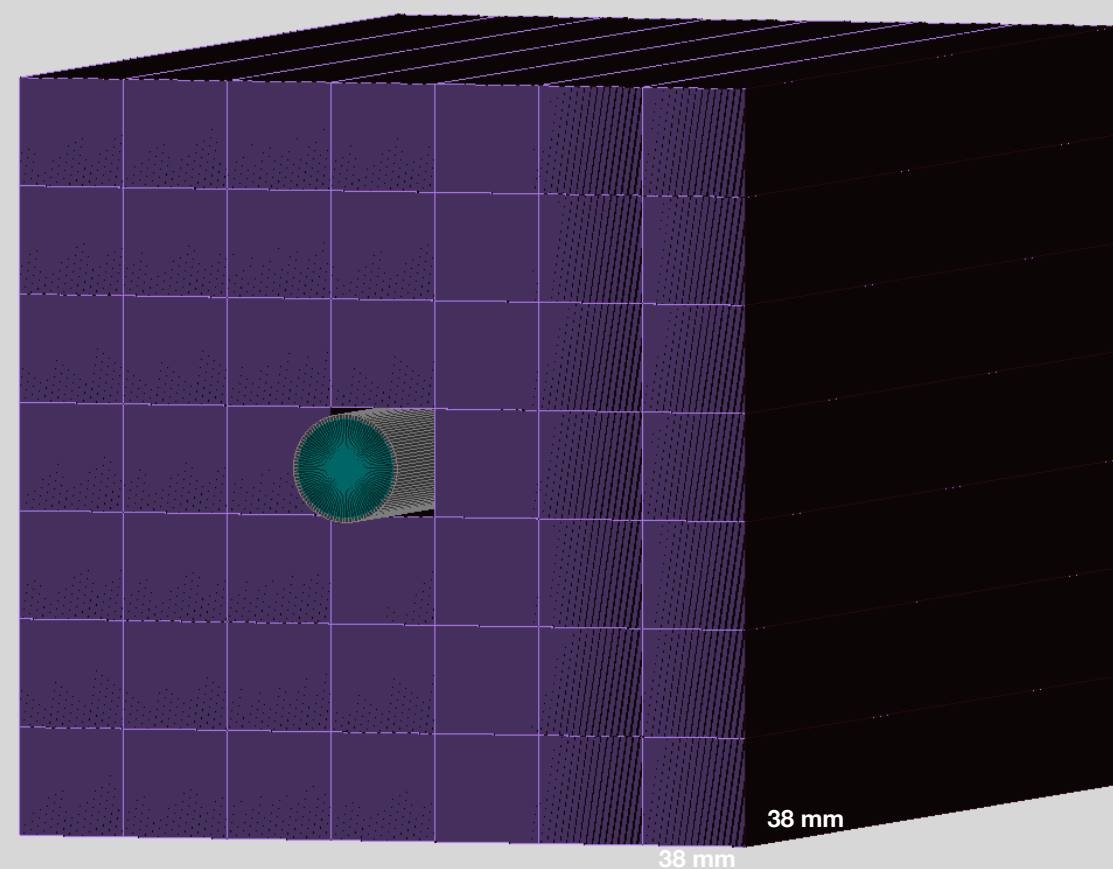
The logo for the LUXE experiment, featuring the word "LUXE" in a bold, blue, sans-serif font. A stylized, multi-pointed star or spark is positioned between the 'X' and 'E'.

Gamma Monitor

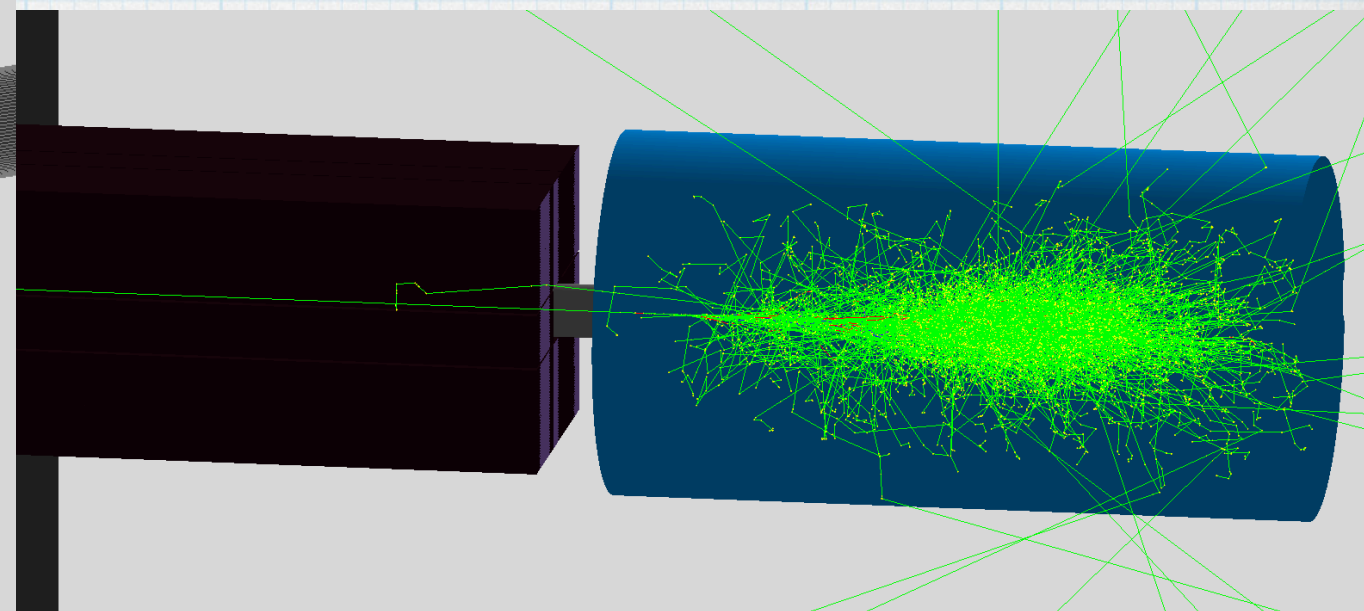


- * The implementation of FDS in Luxe geometry with the LG Gamma Monitor made of new LG blocks in front of Al-Cu Dump,
- * LG w/ measures $3.8 \times 3.8 \text{ cm}^2$, length is 45 cm
- * Wrapped with Aluminium foil of 0.016 mm (typical household foil; no account for air)

Beam Pipe , $R = 19.0 \text{ mm}$, thickness = 1.65 mm



- * Distance between Monitor and Dump 2 cm

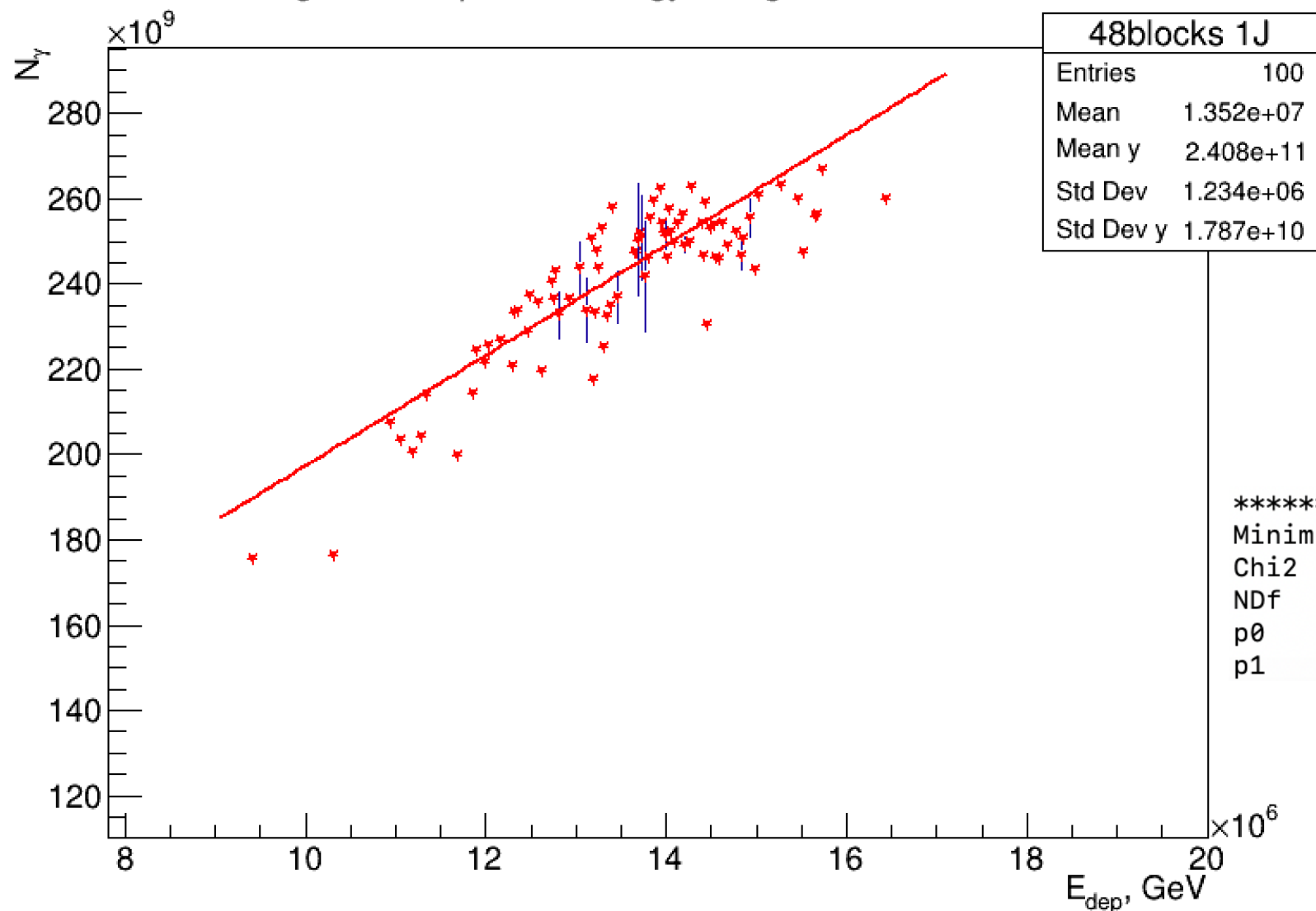


Uncertainties Estimation

$N(E)$ number of photons

$$\Delta N = \frac{\partial N}{\partial E} \Delta E \quad \Rightarrow \quad \frac{\Delta N}{N} = \frac{1}{N} \frac{\partial N}{\partial E} \Delta E$$

Histogram of deposited energy vs Ngamma LG+AlCu 1.0J



for $\xi = 2.6$

$$N \sim 2.5 * 10^{11}$$

$$\frac{\partial N}{\partial E}$$

Minimizer is Linear

Chi2 = 49.2879

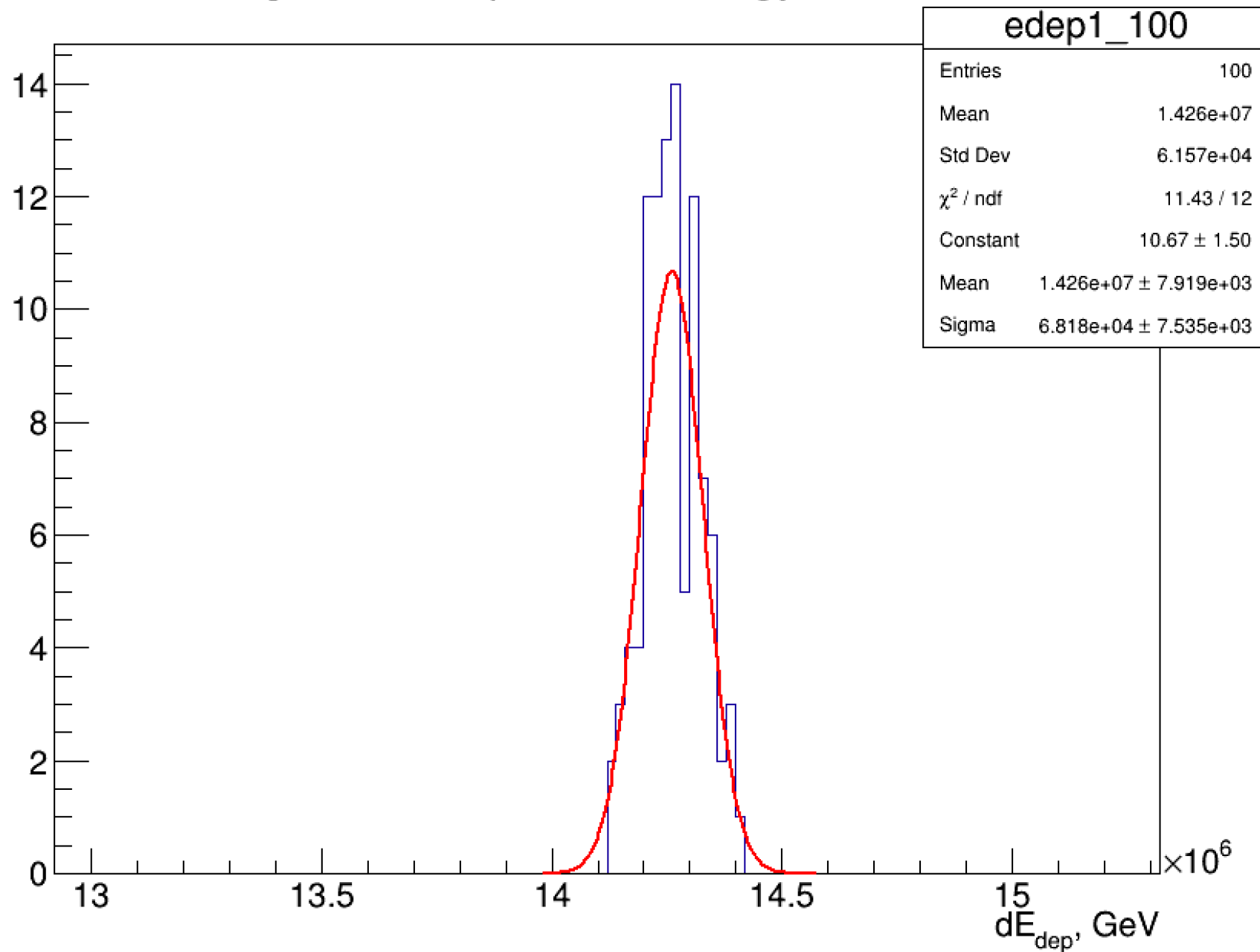
NDf = 13

p0 = 6.79976e+10 +/- 3.97264e+09

p1 = 12940.5 +/- 282.483

ΔE , for $\xi = 2.6$

Histogram of deposited energy 1.0J 100BX



One BX was sent
100 times
 $\Rightarrow \Delta E = 6.8 * 10^4$

$N = 2.5 * 10^{11}$
 $\partial N / \partial E = 12940$

$$\frac{\Delta N}{N} = \frac{1}{N} \frac{\partial N}{\partial E} \Delta E = 6.8 * 10^4 * 1.3 * 10^4 / 2.5 * 10^{11} = 3.5 * 10^{-3}$$

Outlook

- **Gamma monitor studies:**

The uncertainties estimation on number of photons for 48 LG blocks

- ✱ **48 TF1(GAMS) blocks**

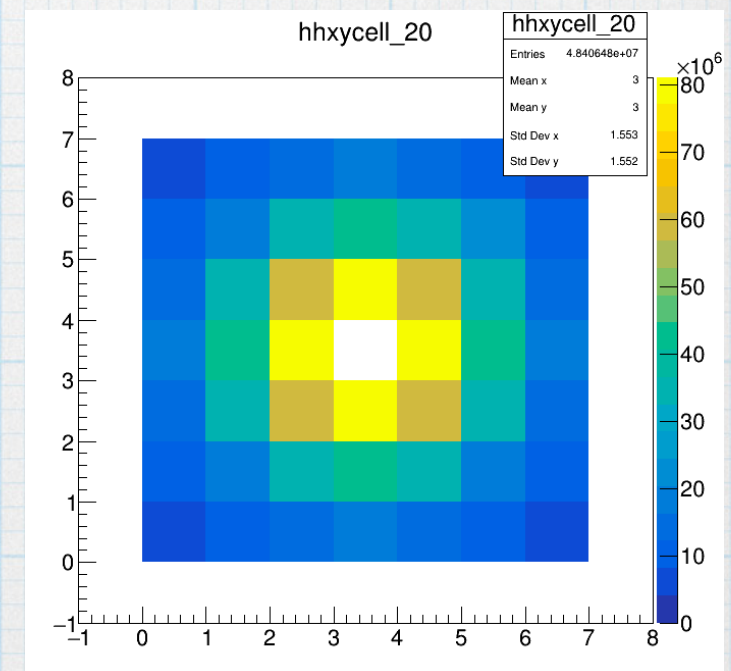
- ✱ **At high laser intensities (1J) for the blocks that closely surround the beam pipe the uncertainty on number of measured photons will be $\sim 3.5 \cdot 10^{-3}$**

- ✱ **To do:**

- ✓ **To estimate uncertainties for other (0.6, 0.35, 0.2, 0.1, 0.01J) laser intensities (running)**

- ✓ **To estimate uncertainties for one LG block**

- ✓ **To estimate uncertainties for each of the three layers**



Back up