DIGITIZATION

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▸ To create the image similar to the image obtained from the detector with sCMOS camera.

▸ Input is the root file obtained from the Geant4 simulation or the text file obtained from SRIM simulation.

▸ These input files contains information about the interactions.(like x, y and z coordinates, energy released in each collision).

▸ Other input file is configuration file, which contains the information about the detector dimension, image dimension, diffusion parameters and photon conversion factor.

▸ These information are used to create the tracks.

▸ In the end Noise is also added to the image to get the digitised image as similar as possible to the camera images.

DIFFUSION

▸ LEMON and LIME has finite drift region, so the tracks diffuses as charges drift in the detector.

▸ Diffusion depends on the distance from the x-y plane of the detector.

▸ Observed value of σ are related to the track's Z by: $\sigma = \sqrt{\sigma_0^2 + B^2 Z}$

▸ Currently we are applying same diffusion to z and y coordinates.

V.C. Antochi et. al., 2020

$$\sigma = \sqrt{\sigma_0^2 + B^2 Z}$$
$\sigma_0 = 292 \pm 12$
$B = 129.7 \pm 3.1$
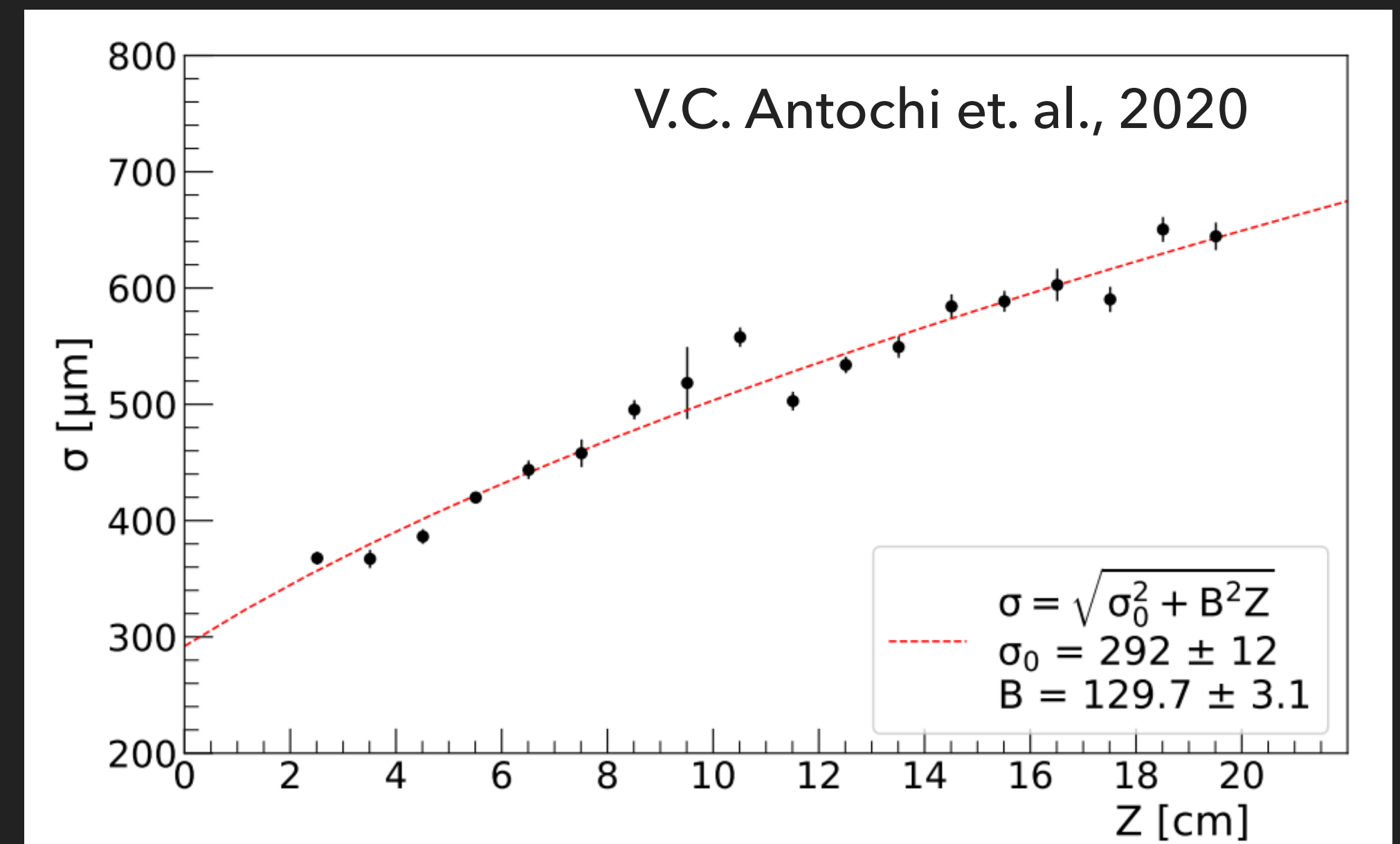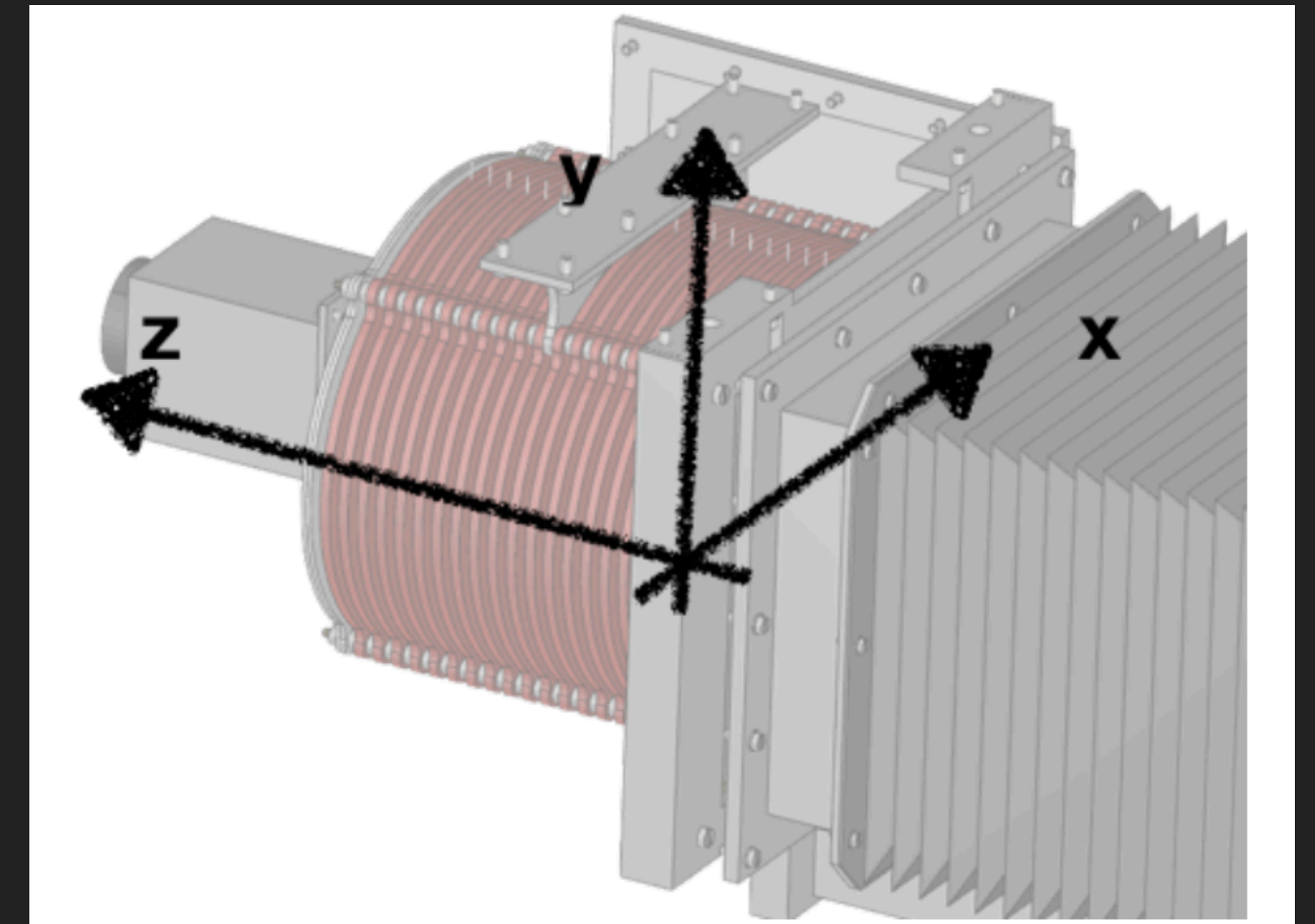
Average σ of transverse light distribution for track segments as a function of the track Z coordinate
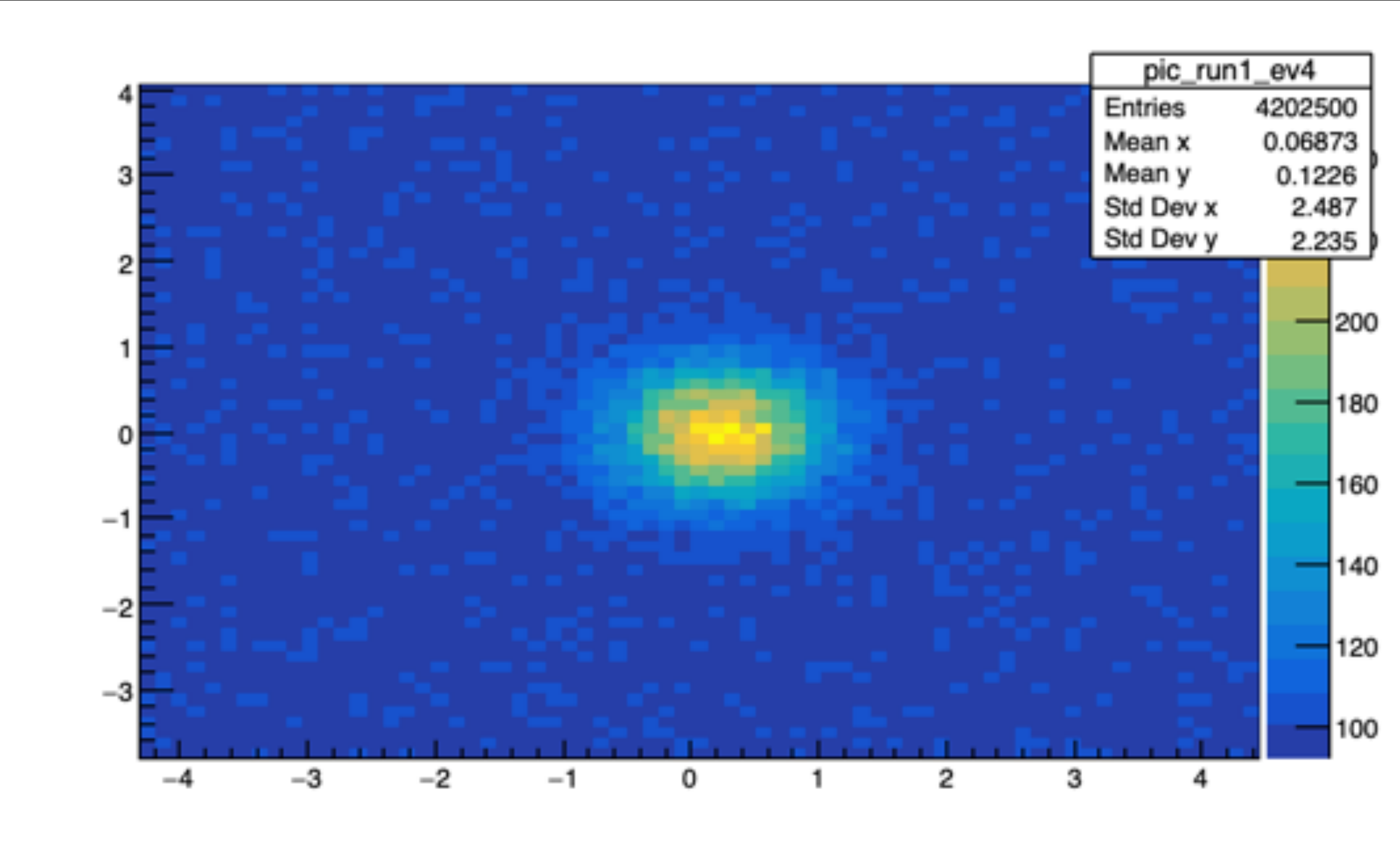
30 KeV NR at z=10cm
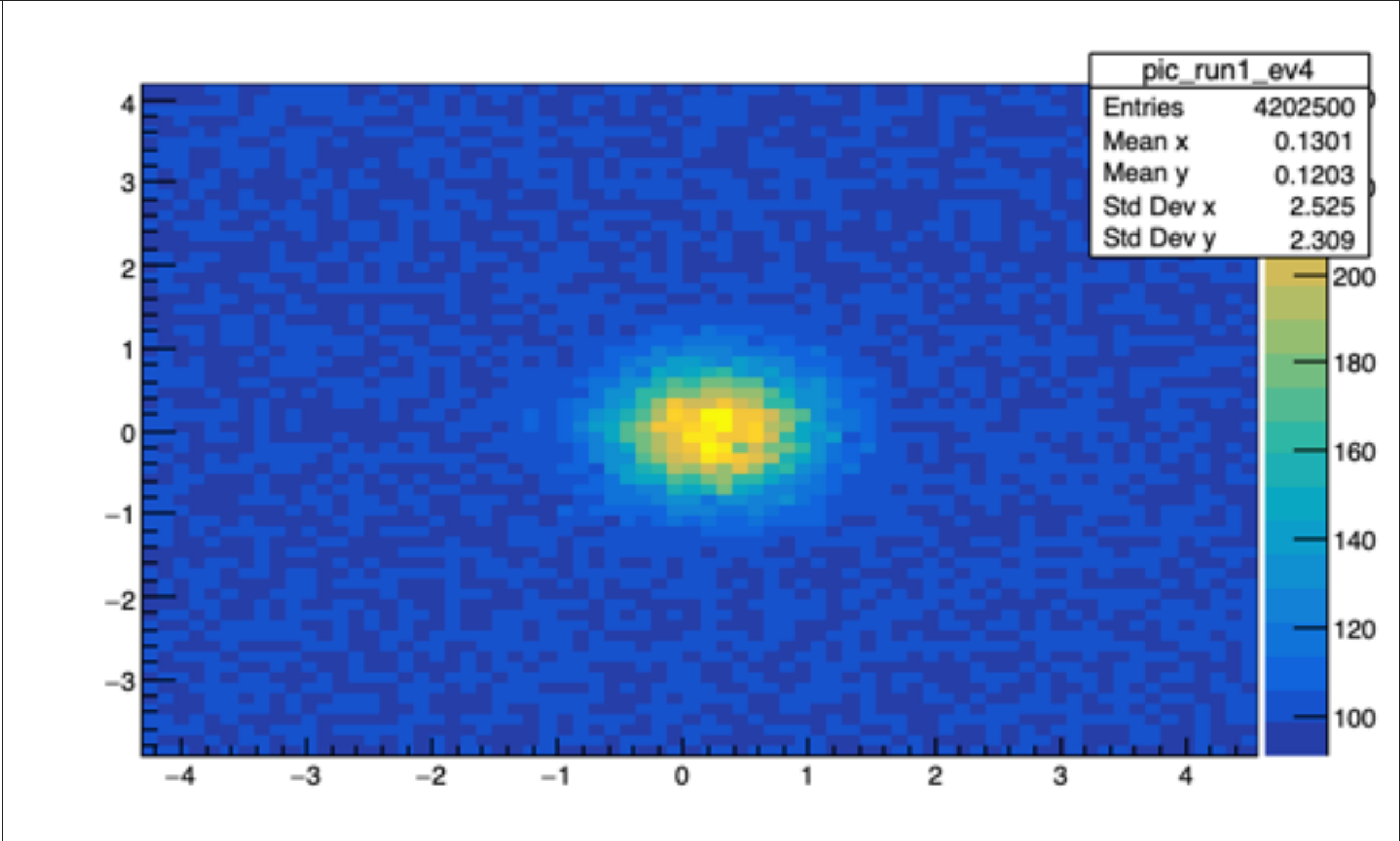

Fig.1: Image with a fixed diffusion of 0.5 mm

Fig.2: Image with varying diffusion according to formula
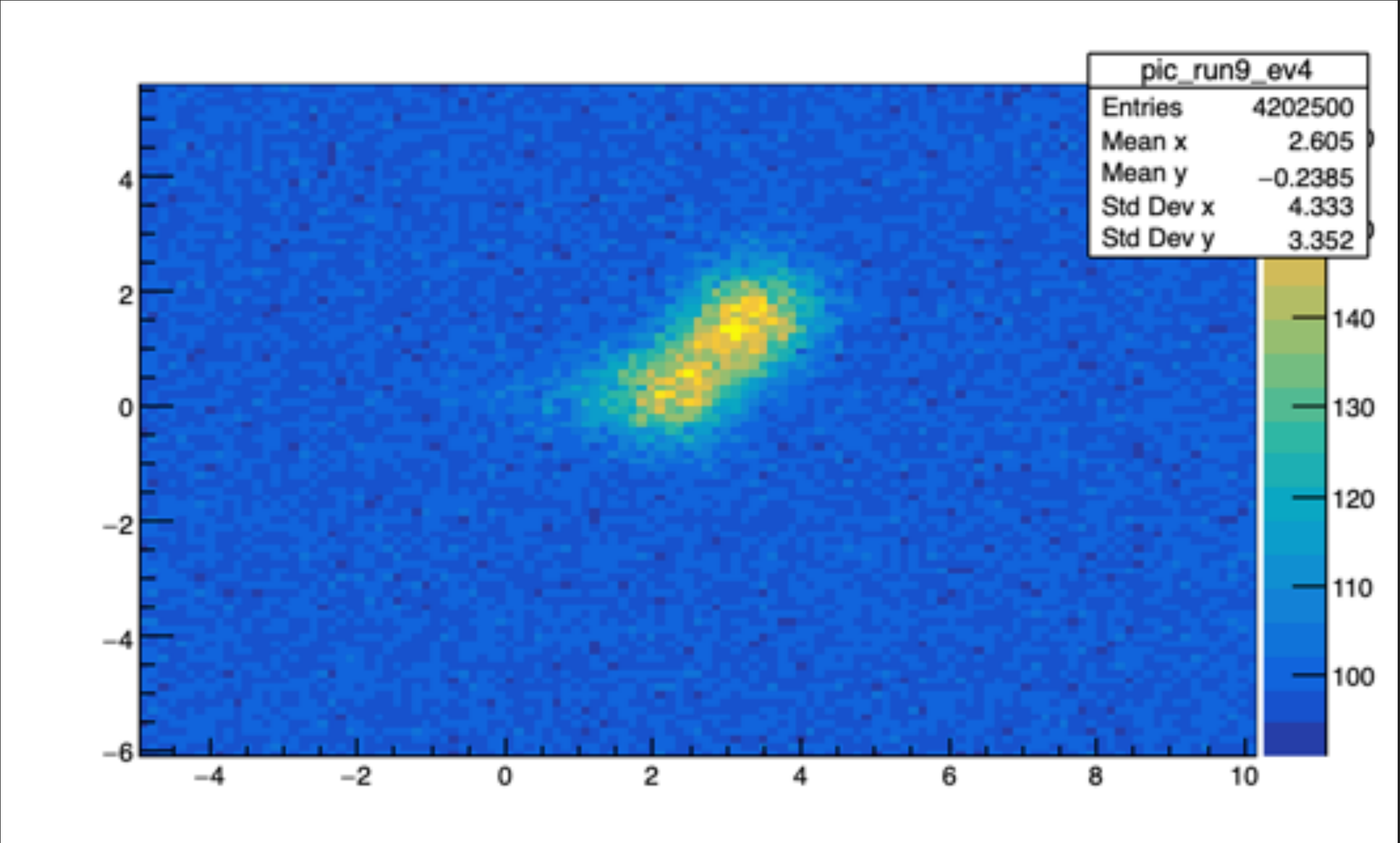
30 KeV ER at Z= 10cm

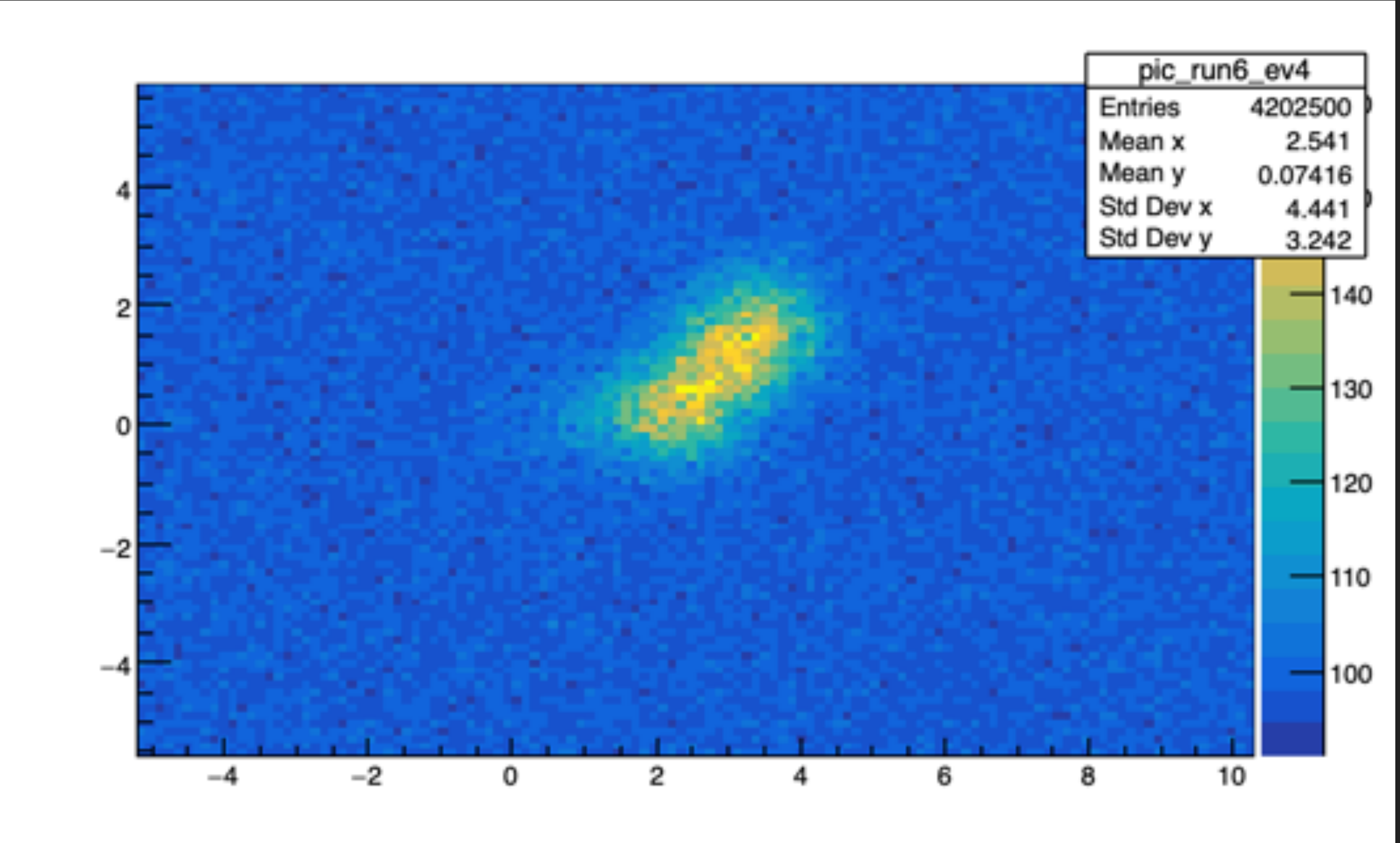Fig.1: 30 KeV ER with a fixed diffusion of 0.5 mm

Fig.2: 30 KeV ER with a varying diffusion according to formula

30 KeV ER at Z= 10cm

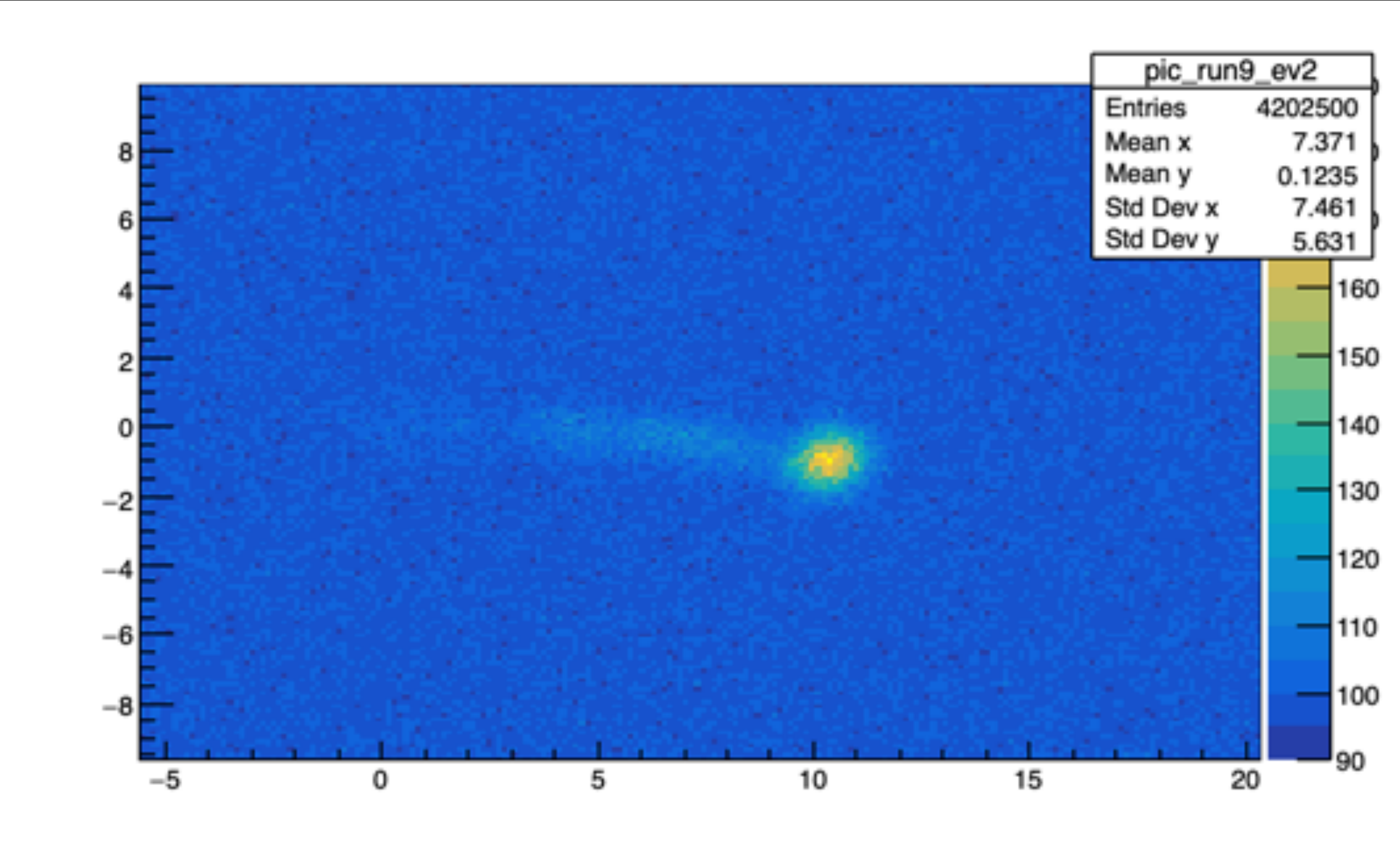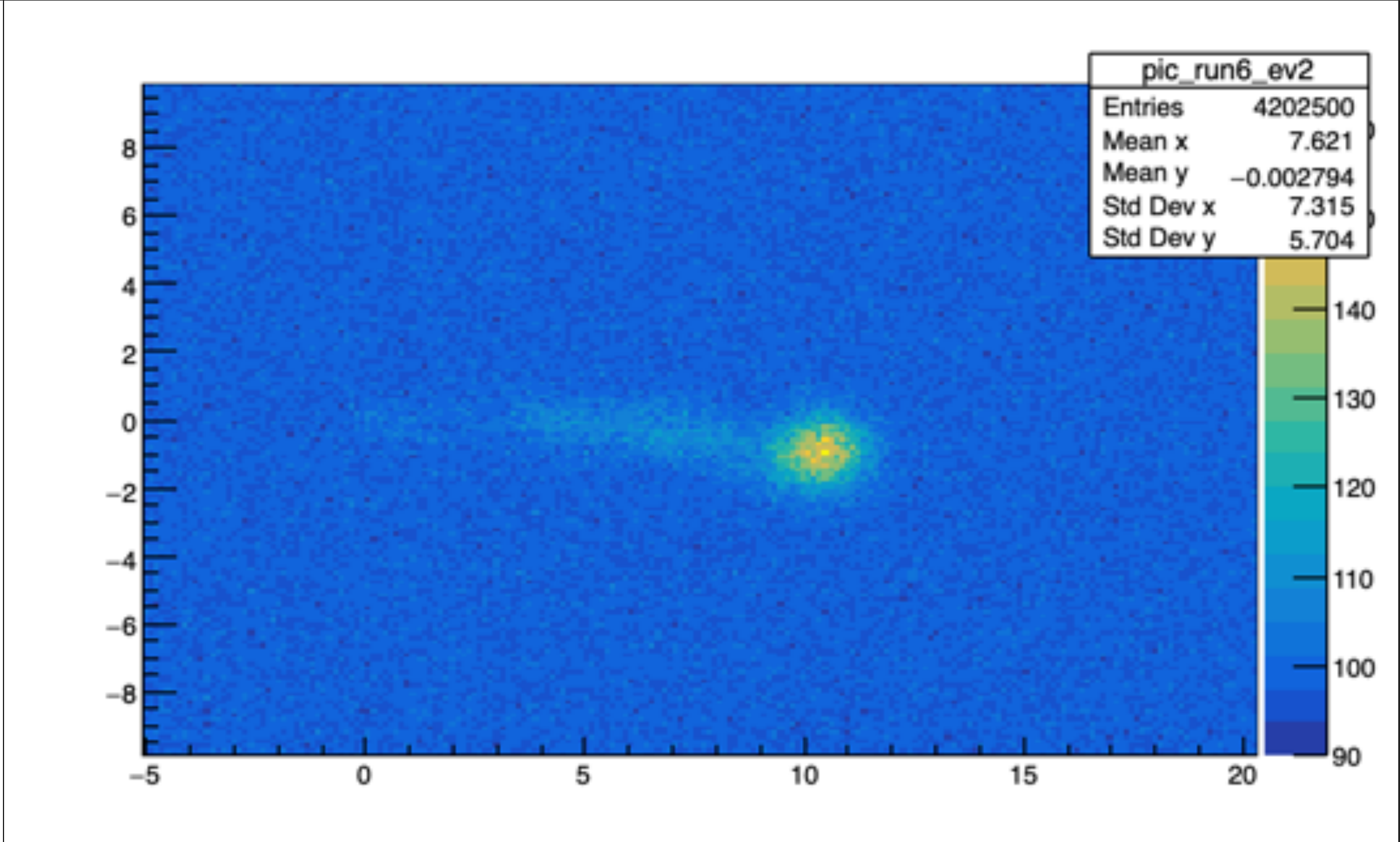Fig.1: 30 KeV ER with a fixed diffusion of 0.5 mm

Fig.2: 30 KeV ER with a varying diffusion according to formula

THANK YOU.