

# Status of the analysis on MC tracks

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# Goal, Inputs & Tools

**Goal** is to use simulated tracks to:

1. find a procedure for particle ID (simple cuts to start with, then...);
2. estimate particle ID efficiency;

## **Inputs:**

- G4 simulations: electron recoils @ different energies (1keV-100keV,  $10^5$  events per point)
- SRIM simulations: nuclear recoils @ different energies (1keV-100keV , 1k events per point)

## **SW tools**

- Digitization (produce images starting from MC tracks, adding diffusion, background,...)
  - Runs on both root files from G4 and txt files from SRIM
- Analysis code from Igor&Emanuele
  - Need to interact with Emanuele to run reconstruction with updated code and DBSCAN parameters used for real data analysis
- Full chain running on the Roma Tre Cluster

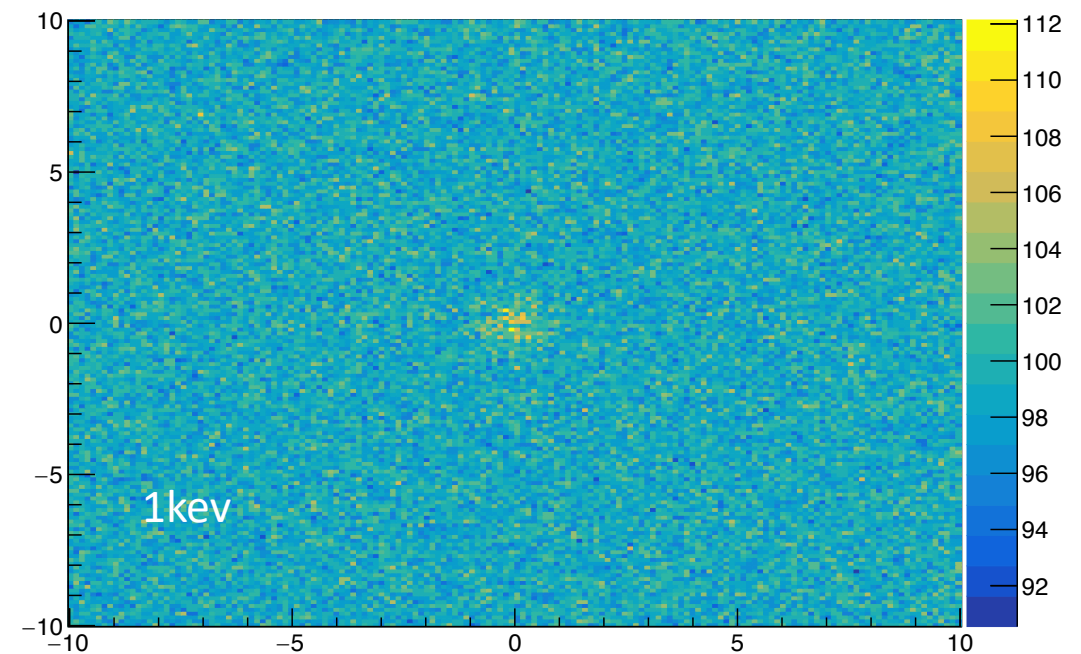
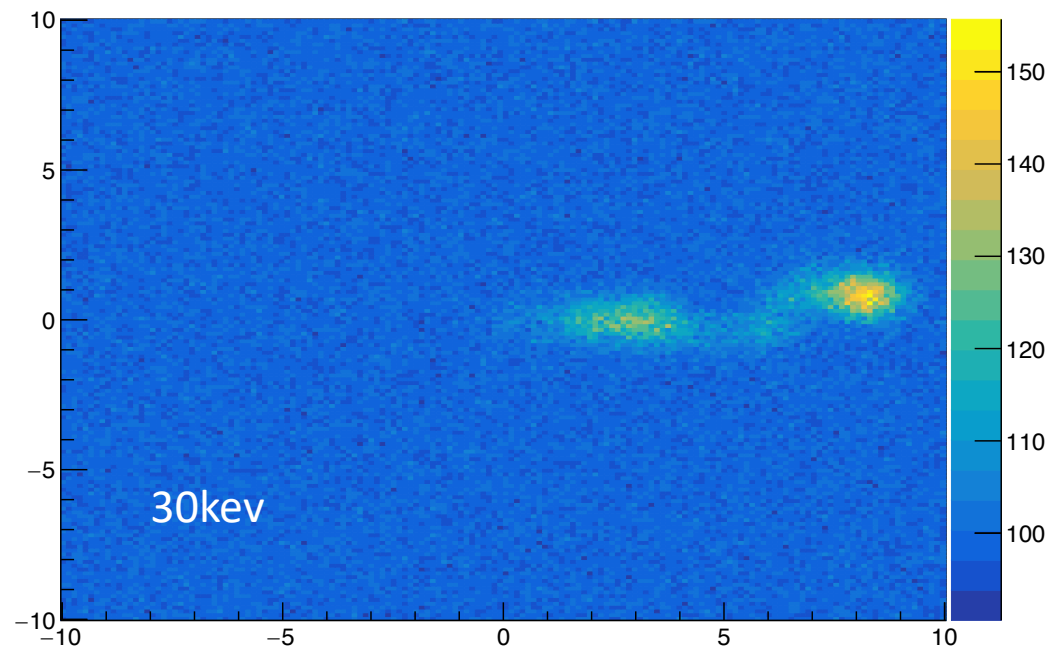
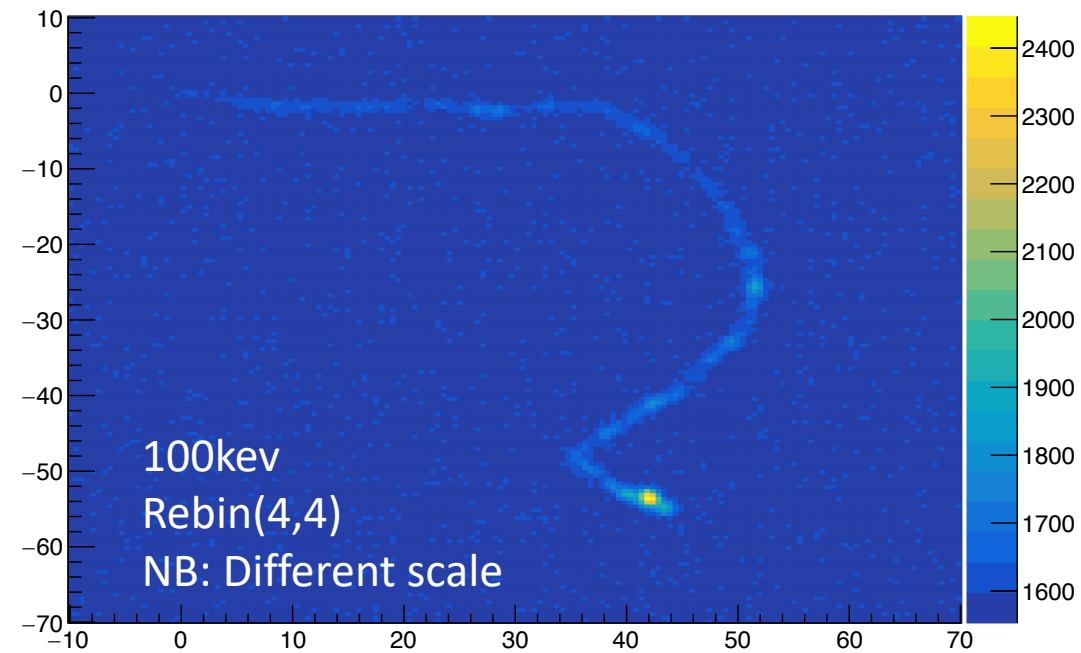
# Digitization parameters

3 different configurations of the digitization for Orange, LEMON and Lime/CYGNO

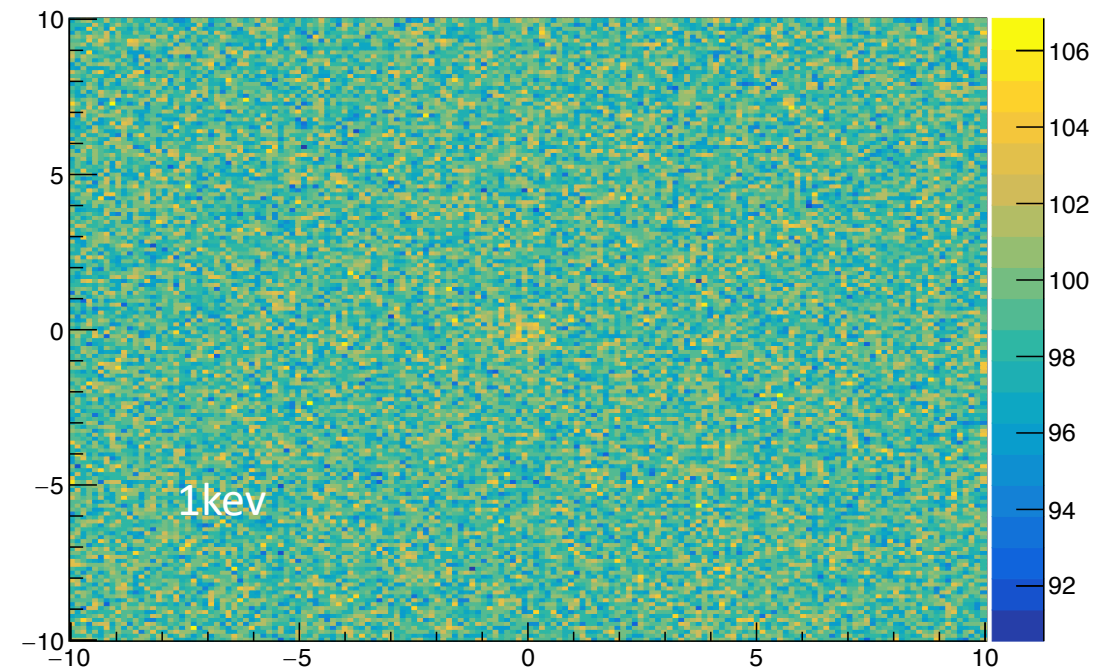
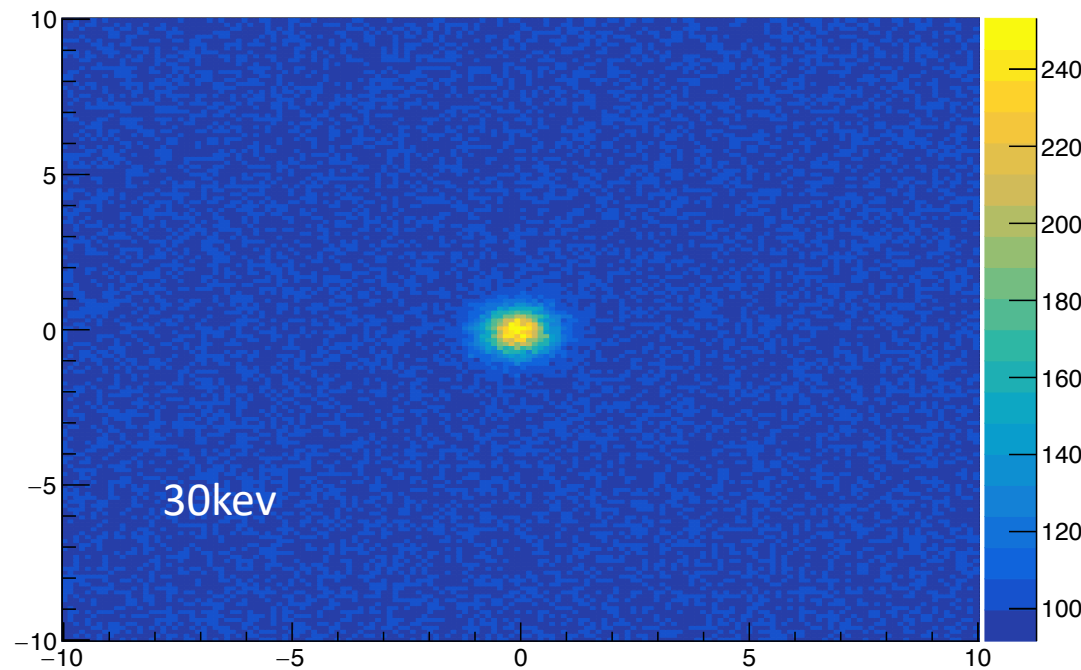
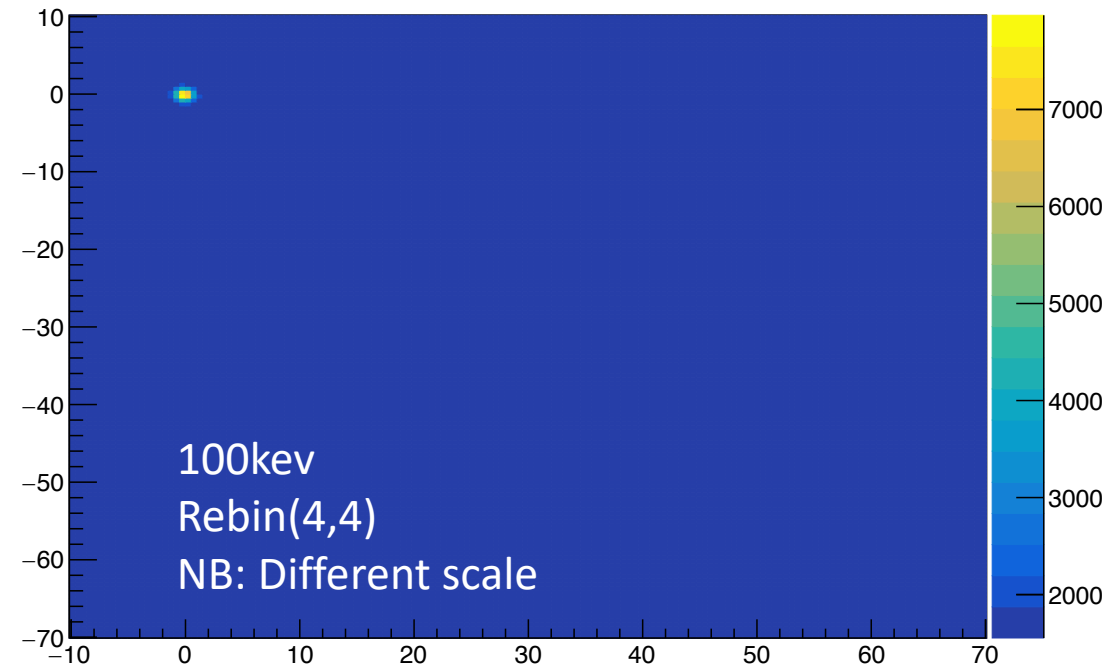
(Lemon parameters used in the following examples)

|                                              | Orange                | Lemon      | Lime/CYGNO            |
|----------------------------------------------|-----------------------|------------|-----------------------|
| Diffusion parameter (mm)                     | 0.11                  | 0.5        | 0.8                   |
| Conversion factor (ph/keV)                   | $5.82 \cdot 3000 / 6$ | $3000 / 6$ | $0.56 \cdot 3000 / 6$ |
| Electronic noise mean                        | 99                    | 99         | 99                    |
| Electronic noise sigma                       | 2                     | 2          | 2                     |
| Dimension of the detector (mm <sup>2</sup> ) | 100*100               | 260*260    | 350*350               |
| pixels                                       | 2048*2048             | 2048*2048  | 2048*2048             |

# Electron recoils (G4)



# Nuclear recoils recoils (SRIM)



# Outlook

- The machinery is in place;
- Need to check/optimize the parameters of the clusterization algorithm, start from parameters used for online reconstruction.