

g+laser Background: Track Reconstruction

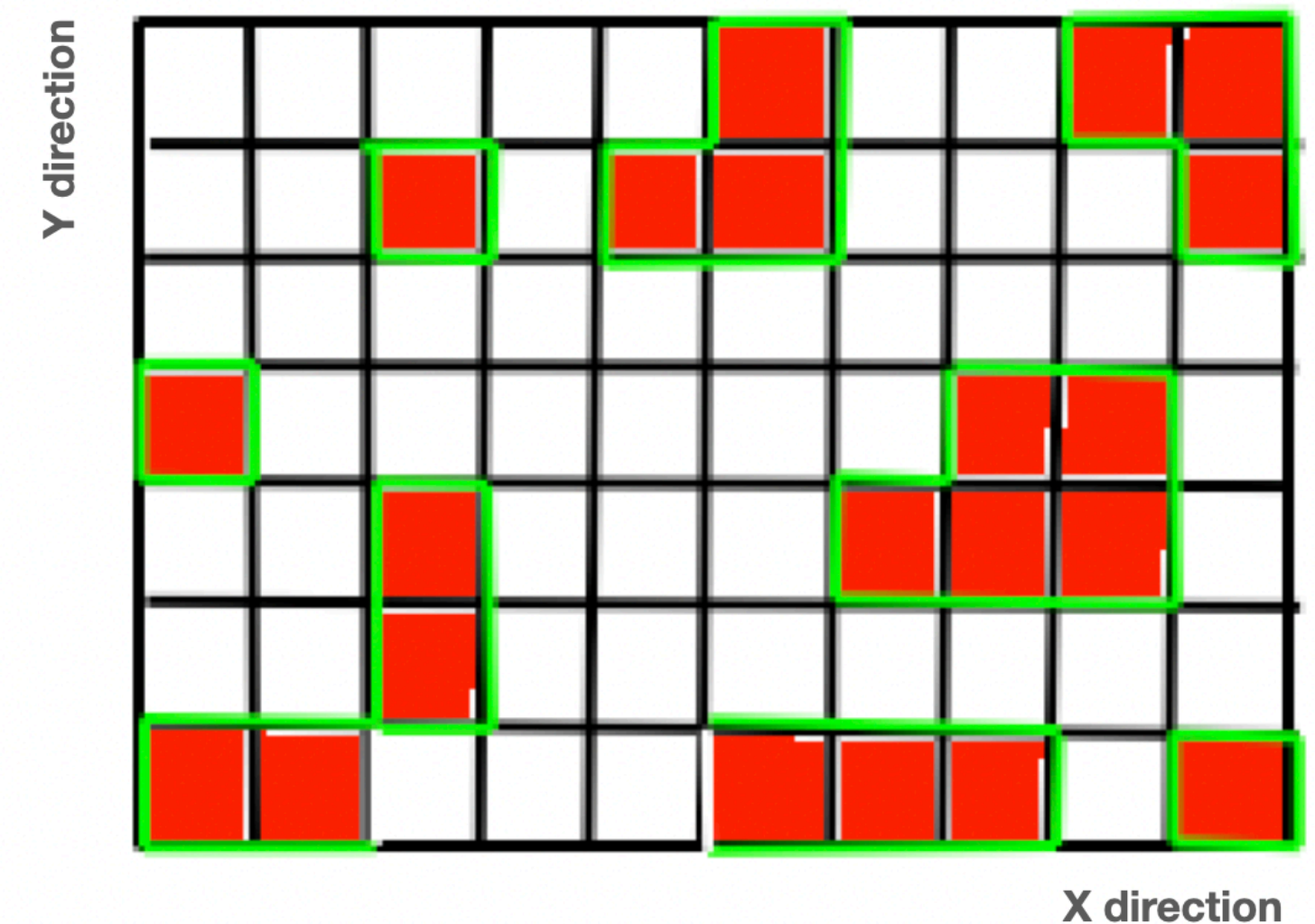
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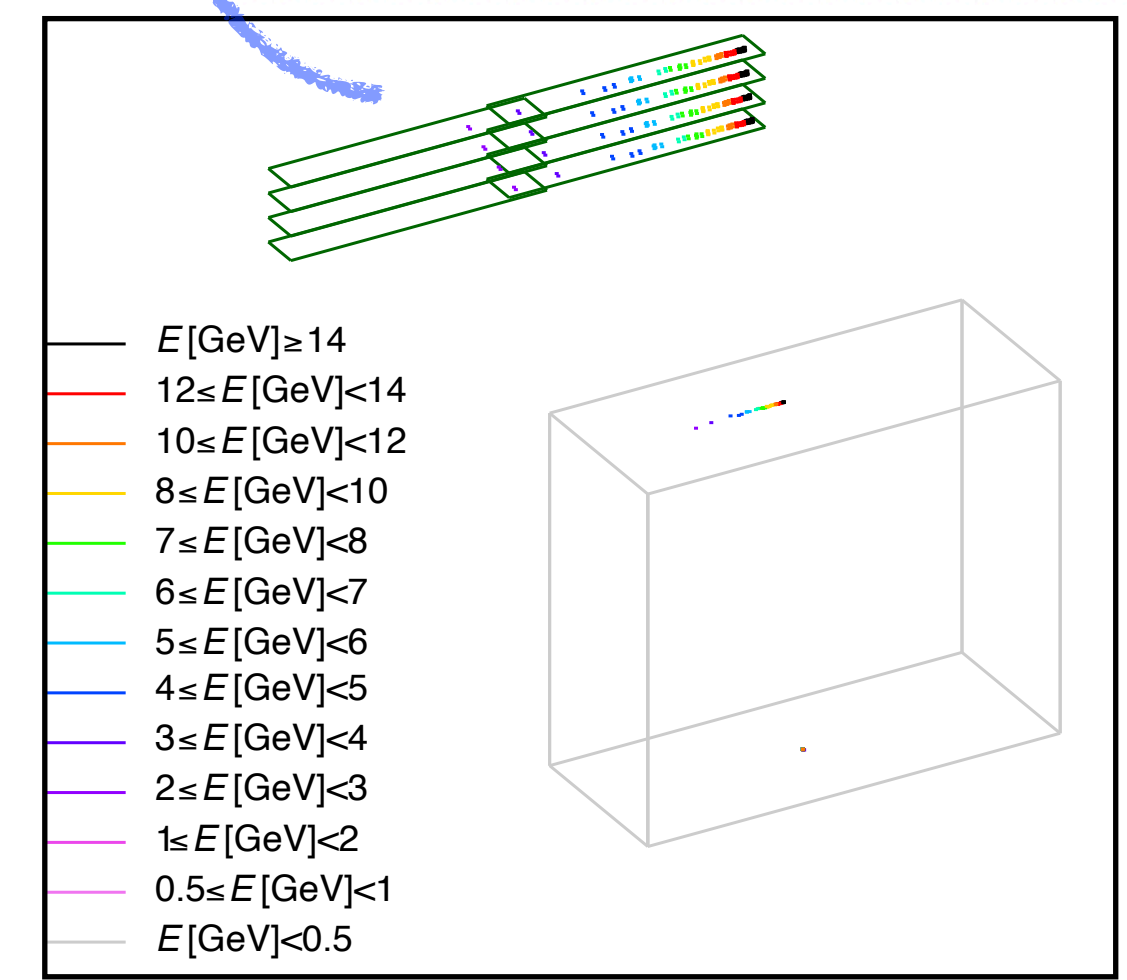
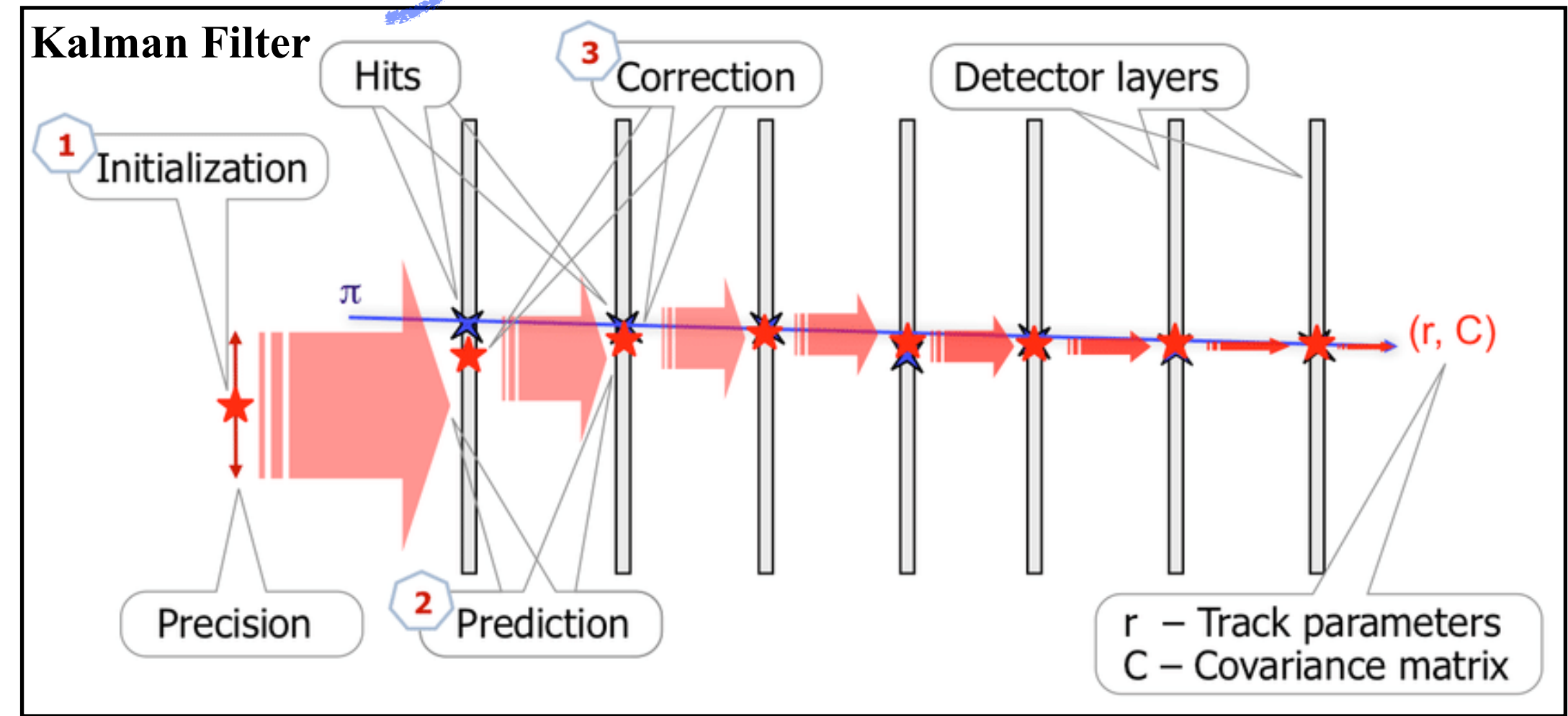
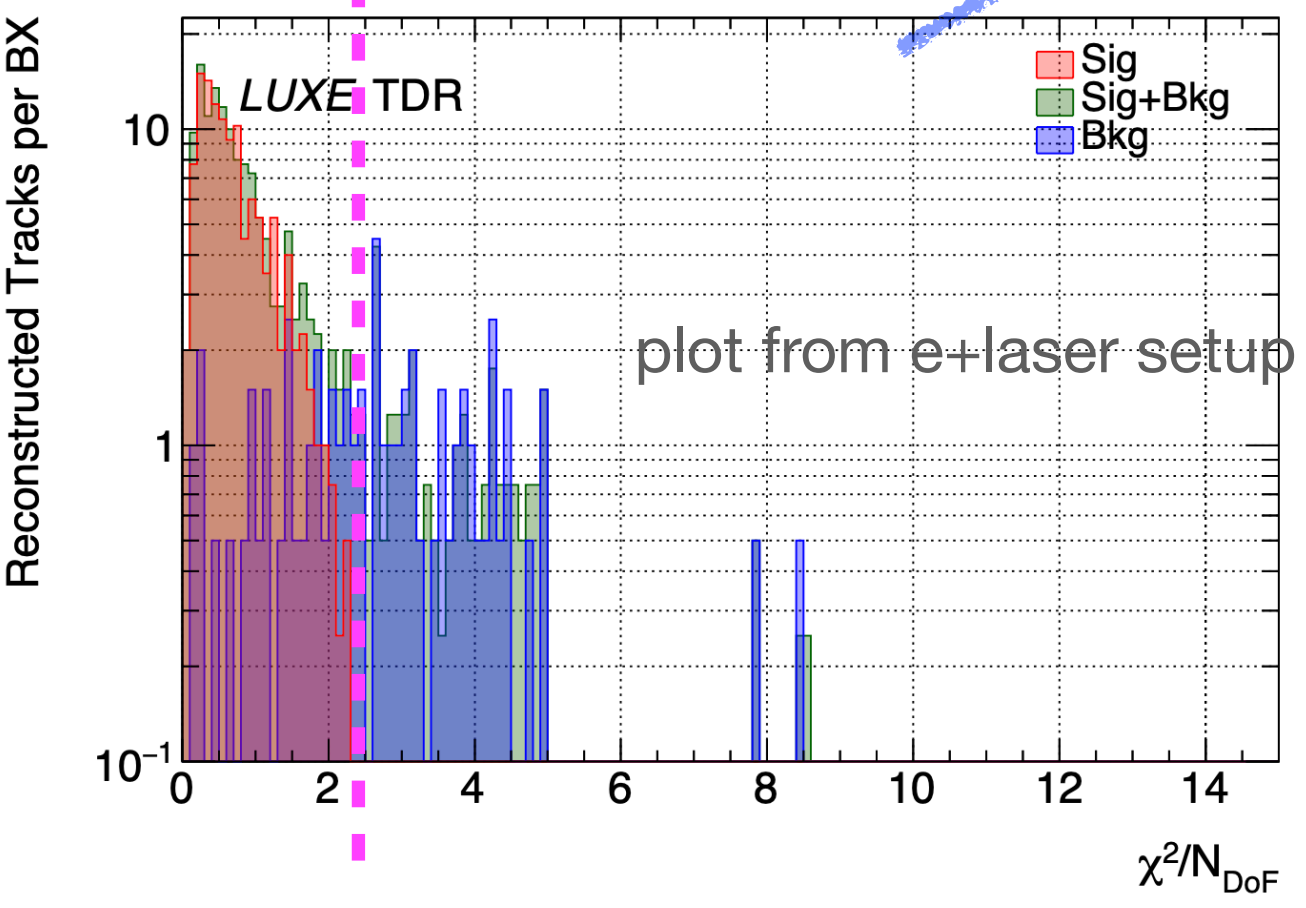
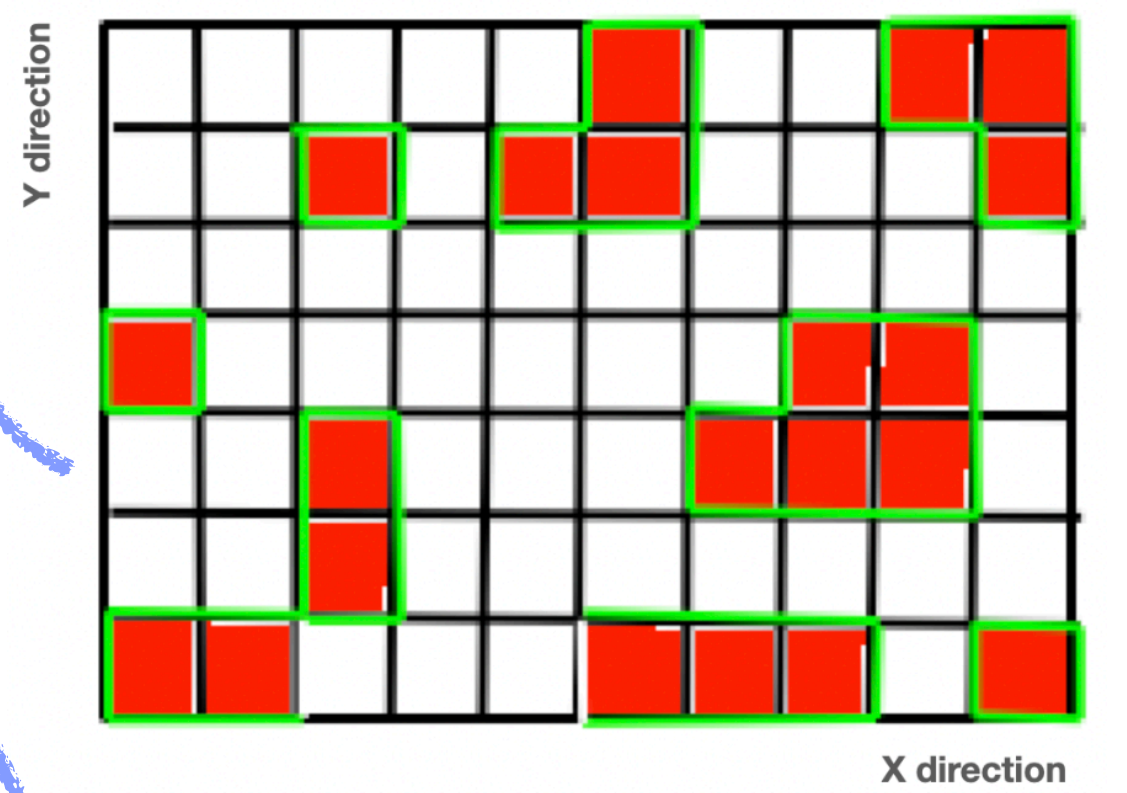
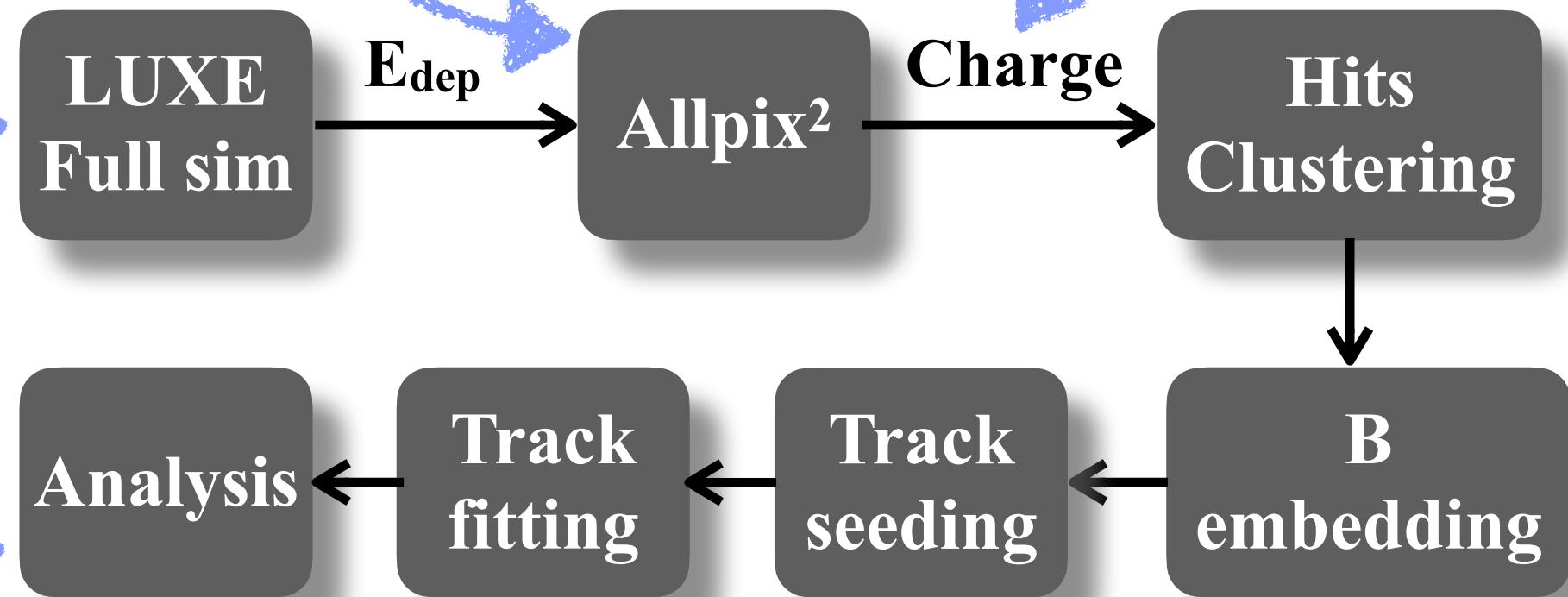
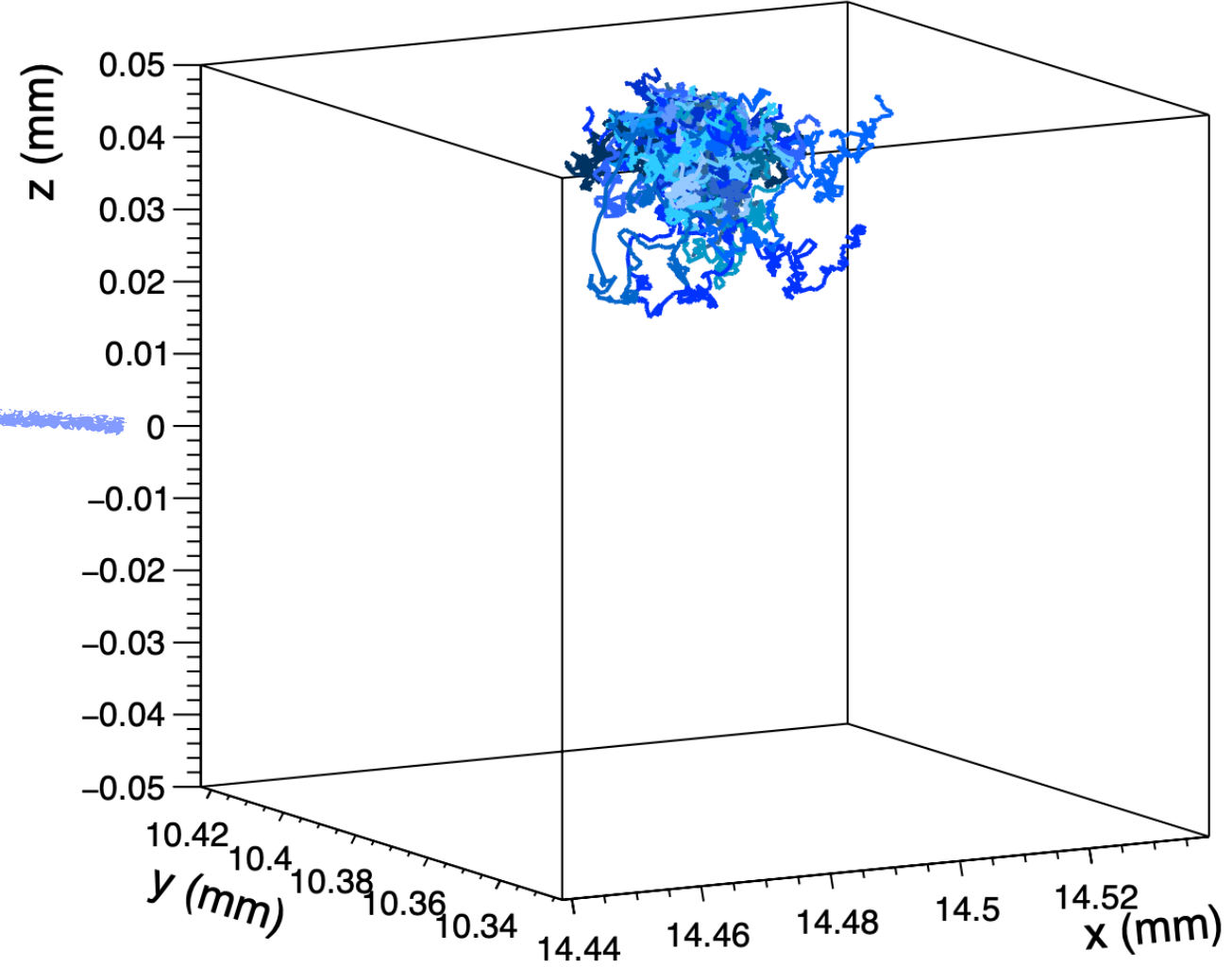
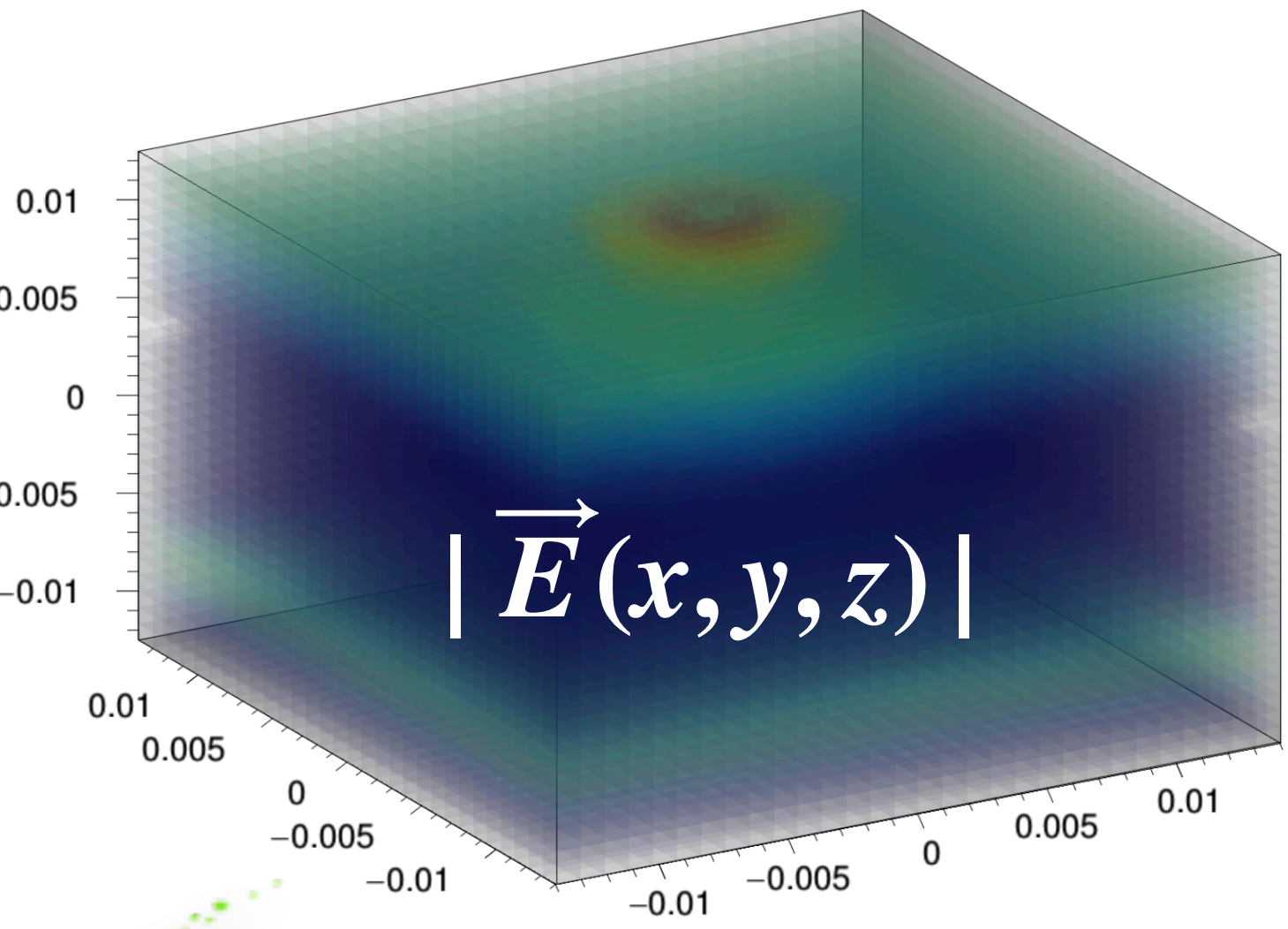
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g+laser background only sample

- We have 1.26 bx of g+laser background only samples.
 - Bremsstrahlung target is 35 μm thick.
 - Digitized the hits using Allpix-squared software setup.
 - Output is the location of fired pixels - pixels gathering more than 120e of charge.
 - Fired pixels were clustered using Packman algorithm.
 - Same set of configurations as we used for the e+laser samples for the tracker TDR.

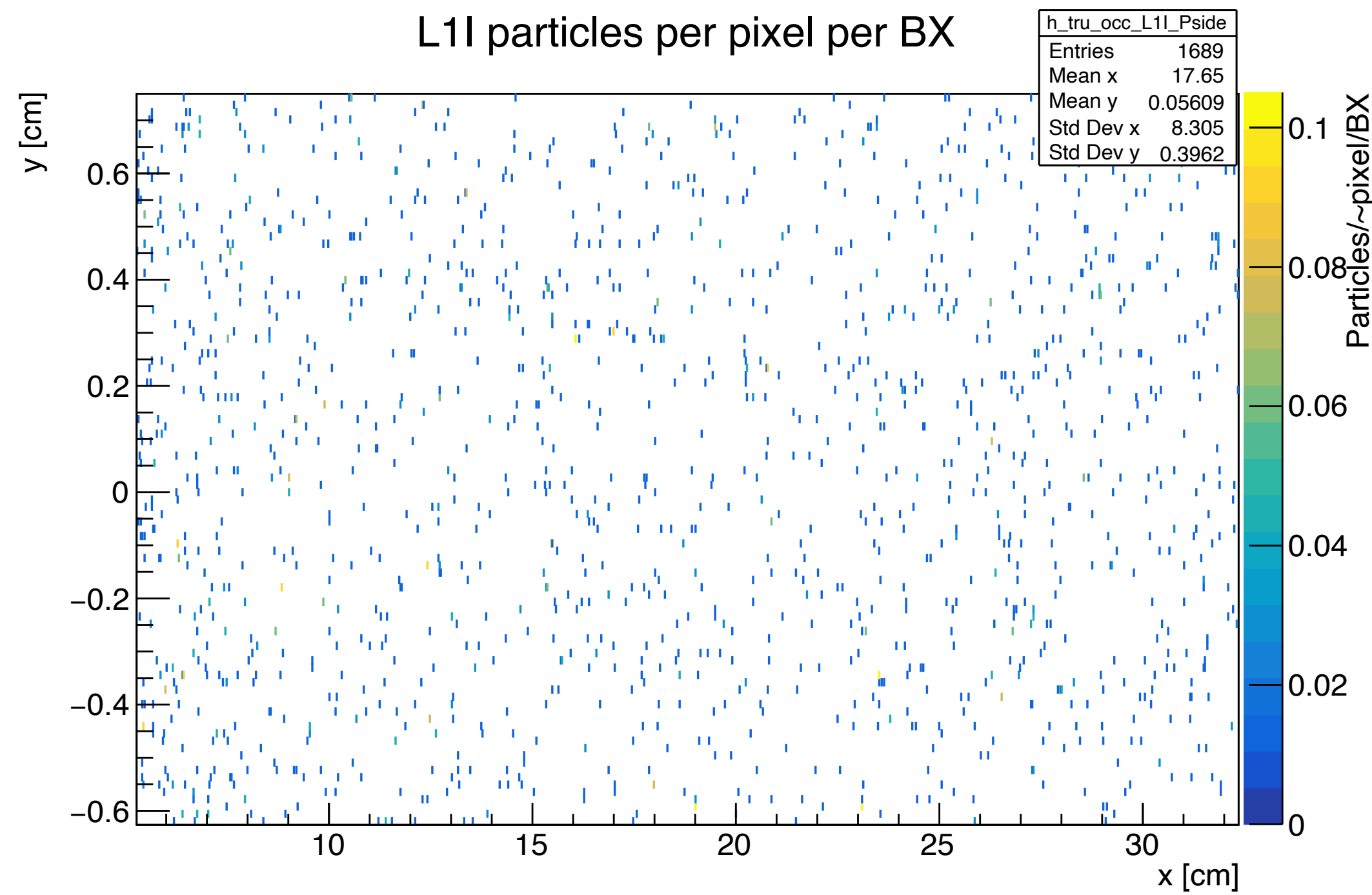


Reconstruction chain



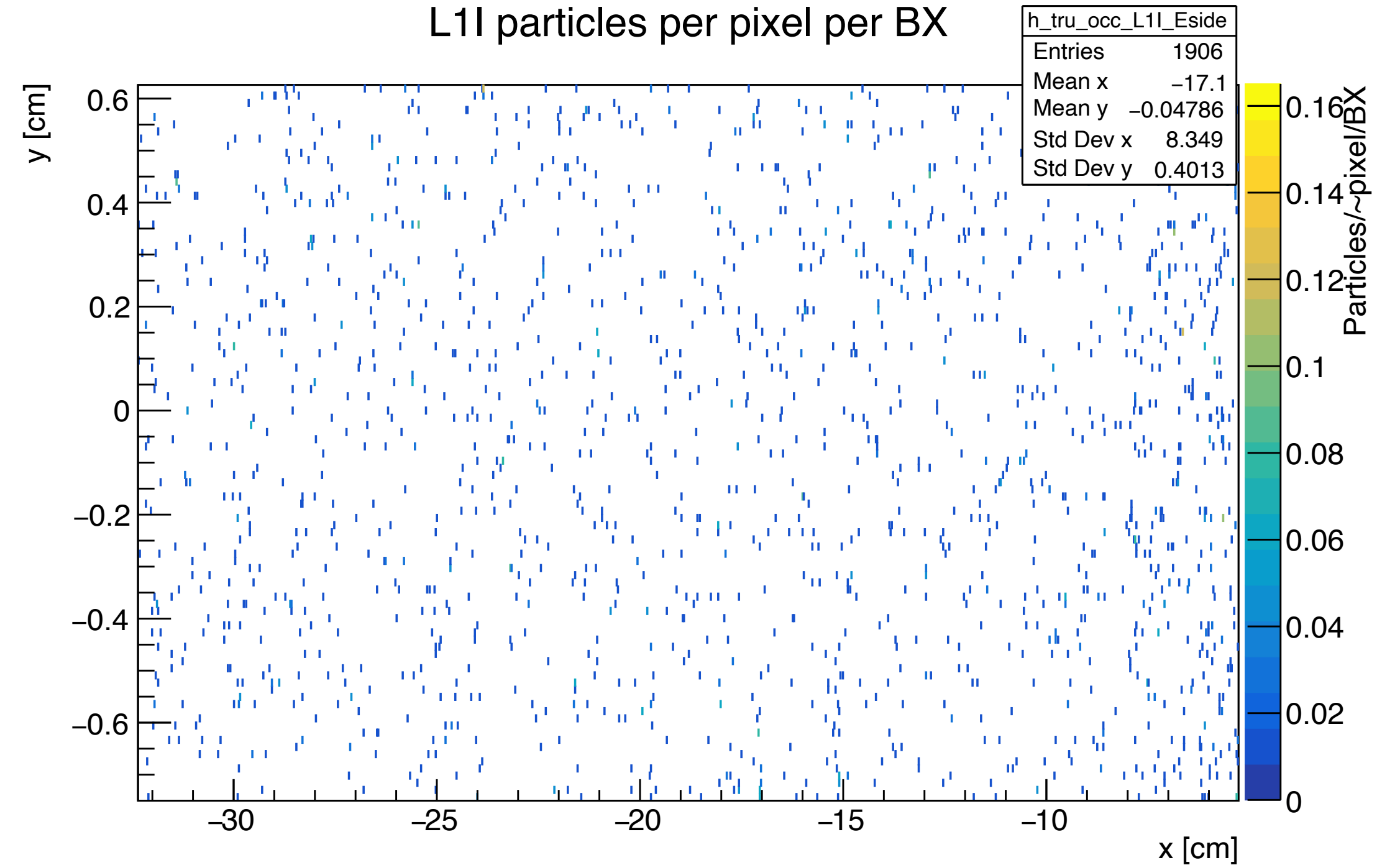
Truth occupancy plots: g+laser background samples

Number of truth particles associated per fired pixel per BX



First stave, first tracker layer: P side

Integral: 25.3 ± 0.6

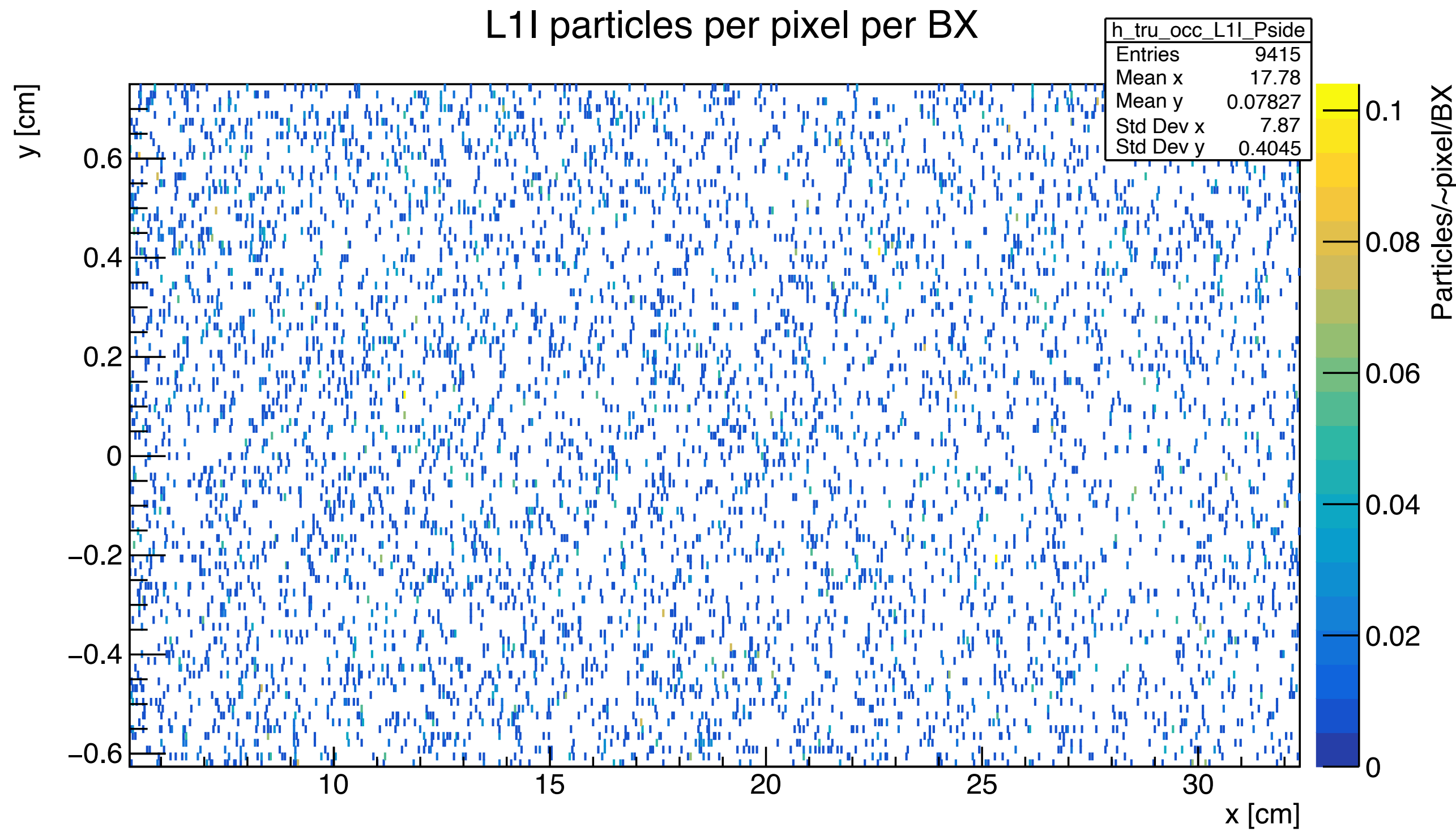


First stave, first tracker layer: E side

Integral: 28.6 ± 0.7

Truth occupancy plots: **e+laser** background samples

Number of truth particles associated per fired pixel per BX



- e+laser background had more particles/pixels per BX compared to g+laser background.

First stave, first tracker layer: P side

Integral: 89.0 ± 0.9



More than 3 times of g+laser

Cutflow and outlook

- Due to more occupancy in e+laser bkg, background tracks survived many quality cuts.
- For g+laser background samples, 0 track is surviving the quality cuts
 - All tracks are killed at KF Tracks stage
 - Meaning less than 4 hits per track.
- **Caveat:**
 - The tracking algorithm is **tuned for e+laser** signal samples - due to lack of g+laser signal sample, it is not tuned for g+laser (yet).
 - No g+laser bkg track surviving may be an artifact of that.
- **To do:**
 - Sasha is preparing g+laser needle run samples (contain both signal and background).
 - Will run the reconstruction algorithm.
 - g+laser signal samples will be processed.

