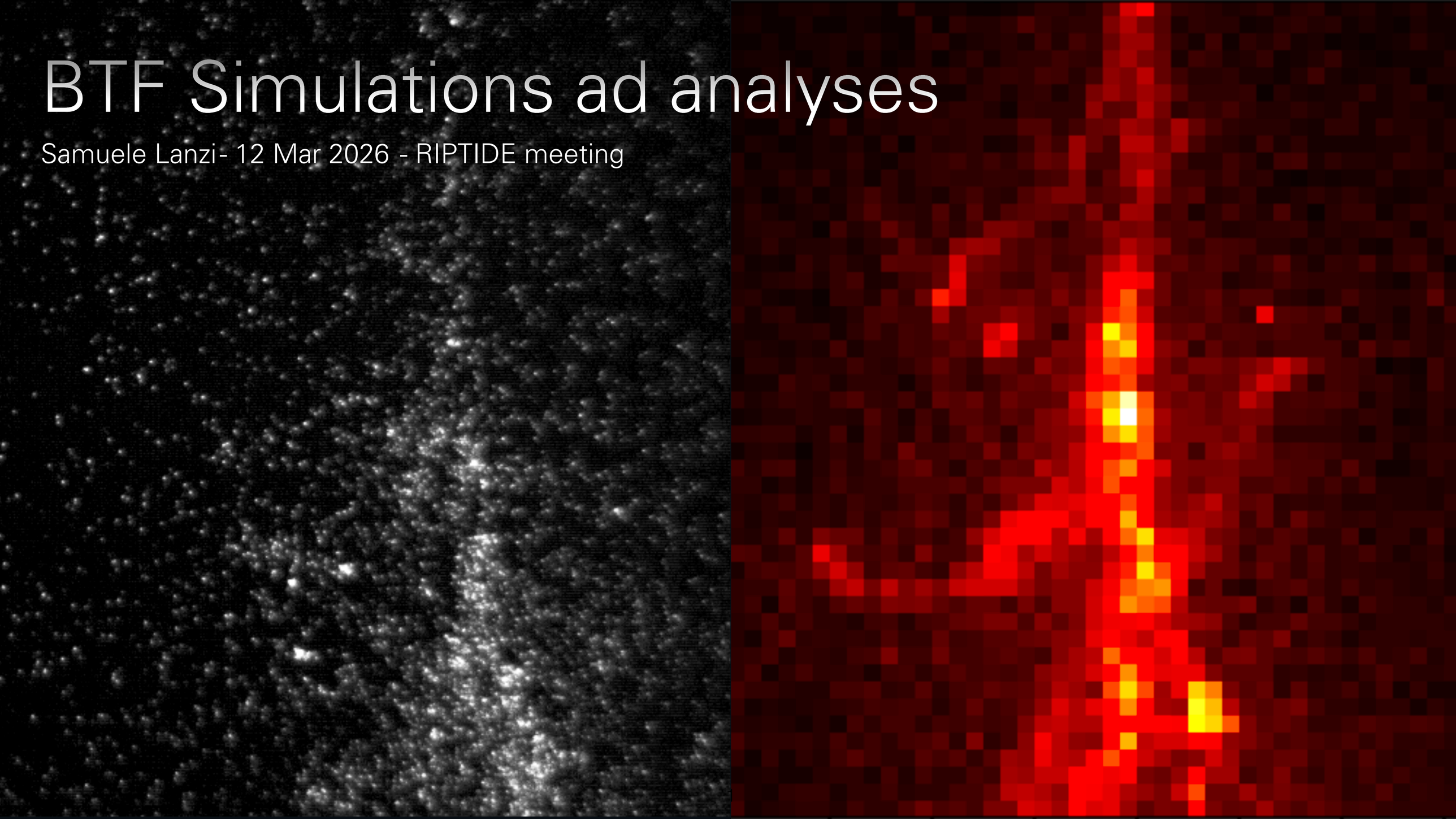
BTF Simulations ad analyses

Samuele Lanzi- 12 Mar 2026 - RIPTIDE meeting

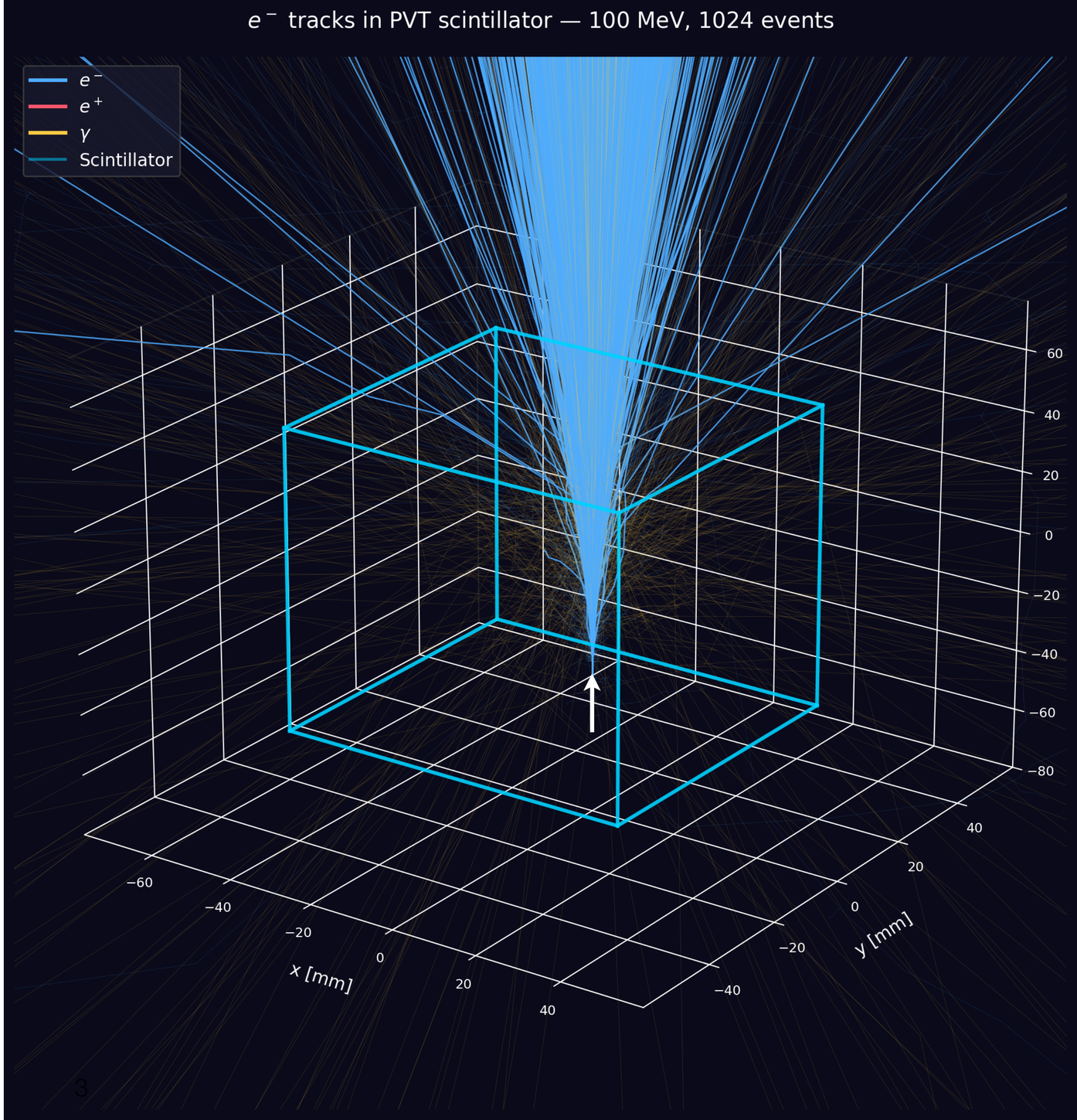


Simulations

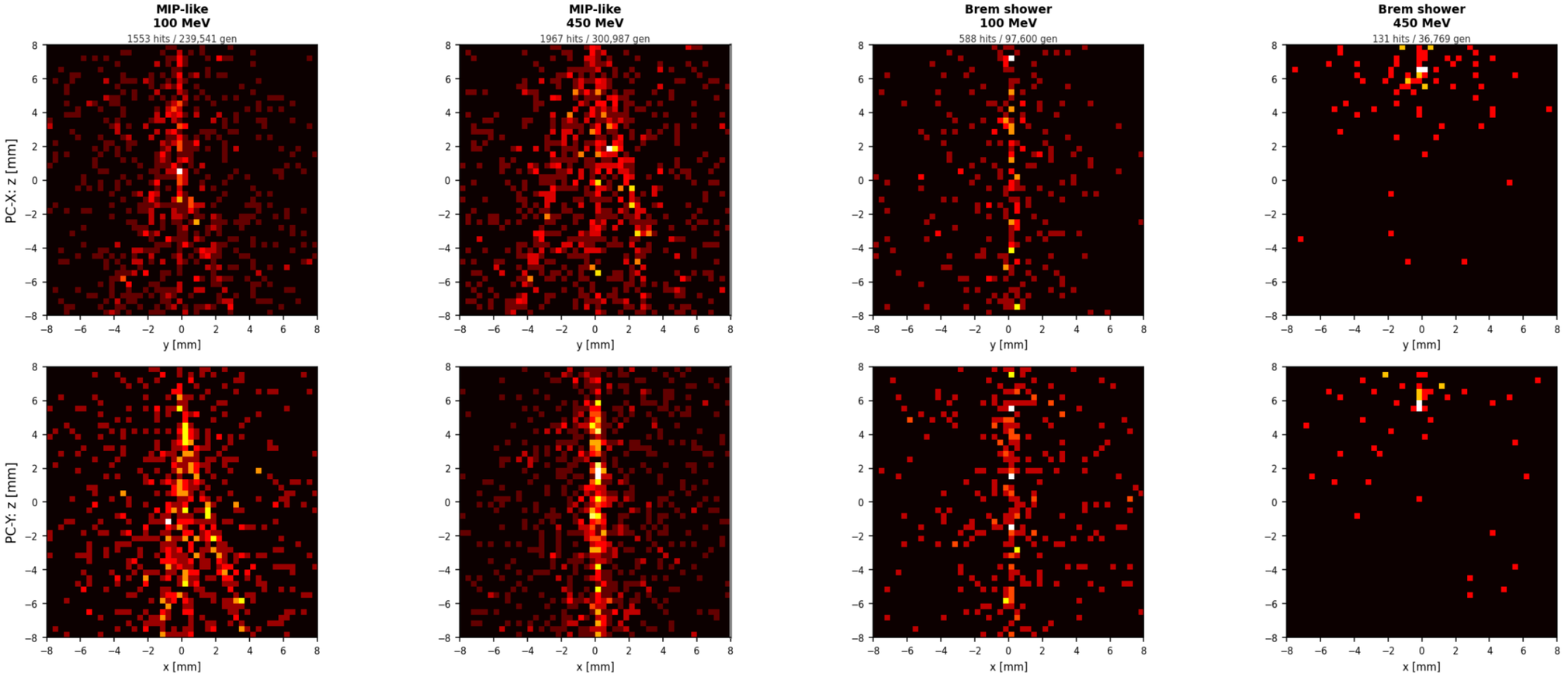
Electrons

Two datasets were simulated:

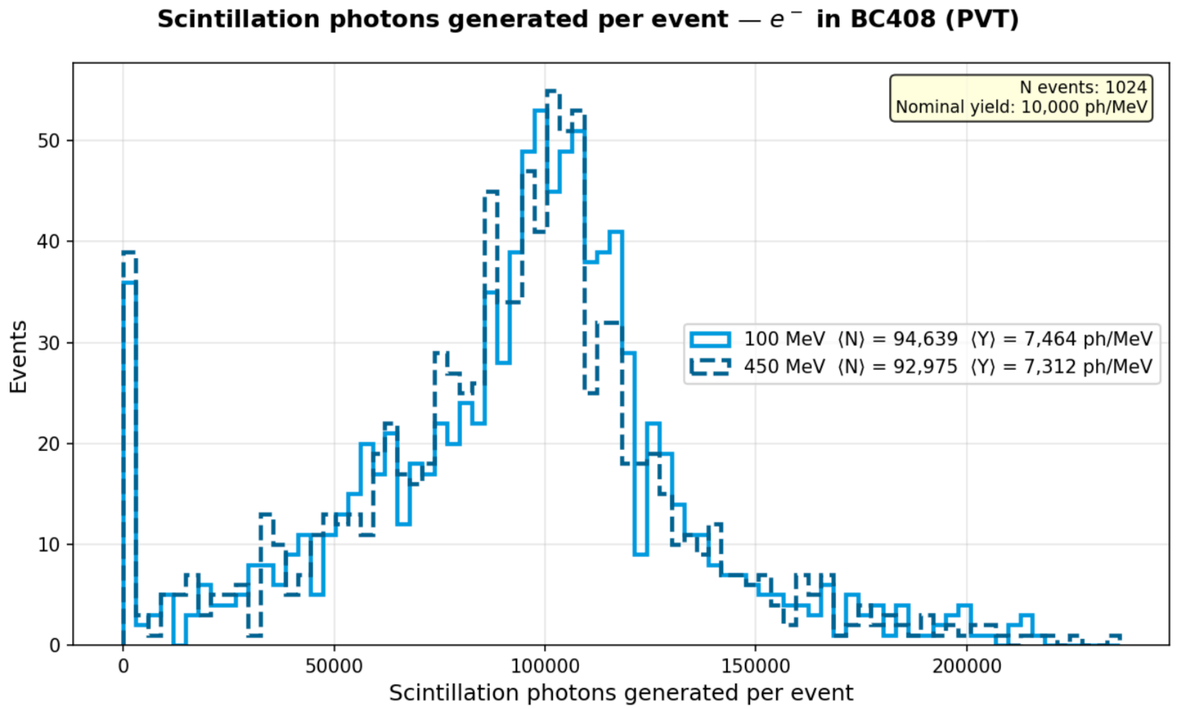
- 1024 electrons 100/450 MeV in BC408
- 128 electrons 100/450 MeV in CsI

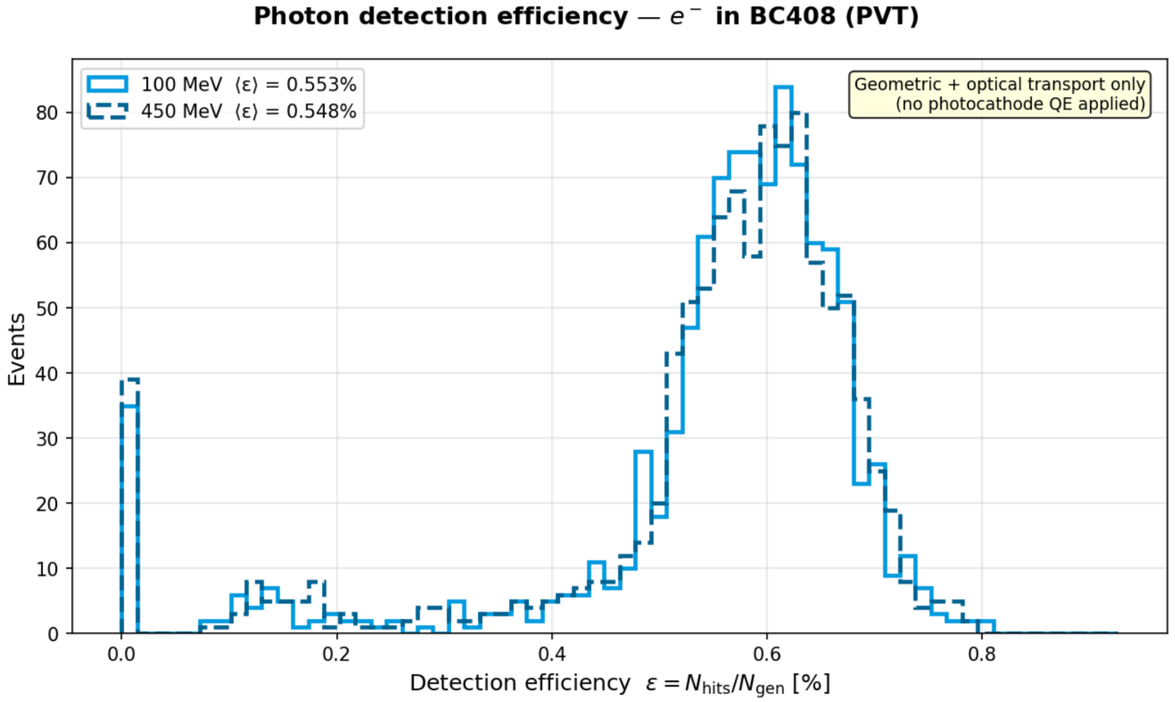


BC408 events analysis

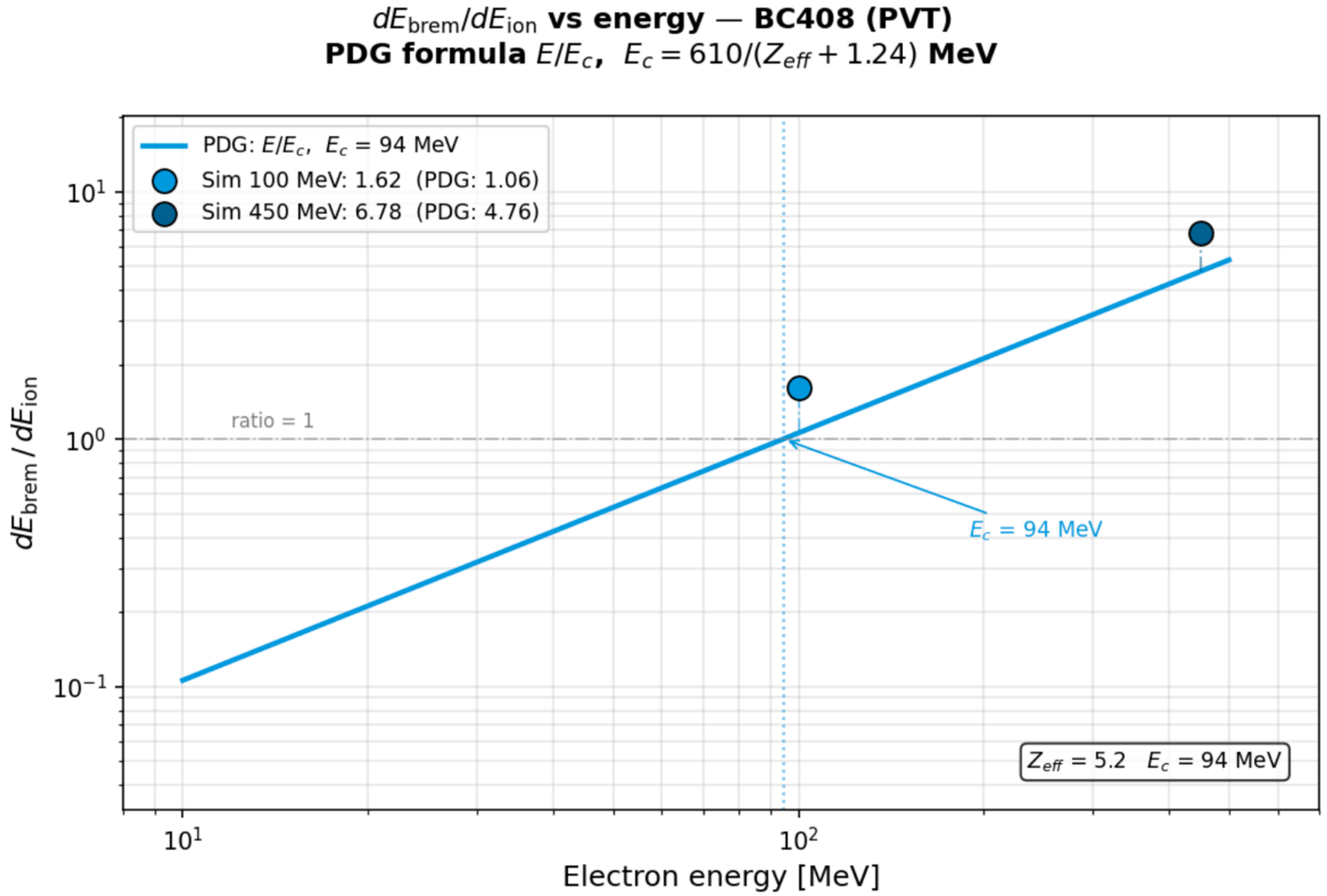


BC408 events analysis

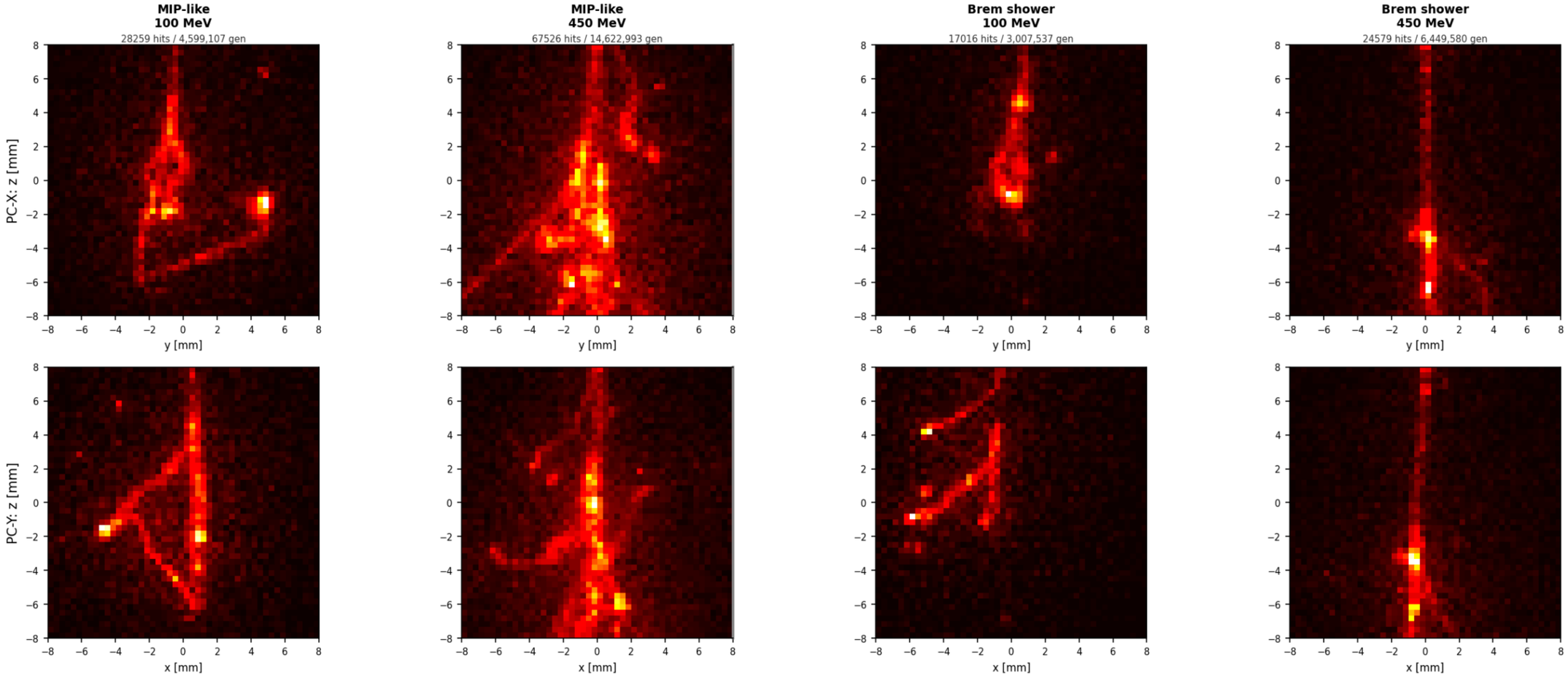




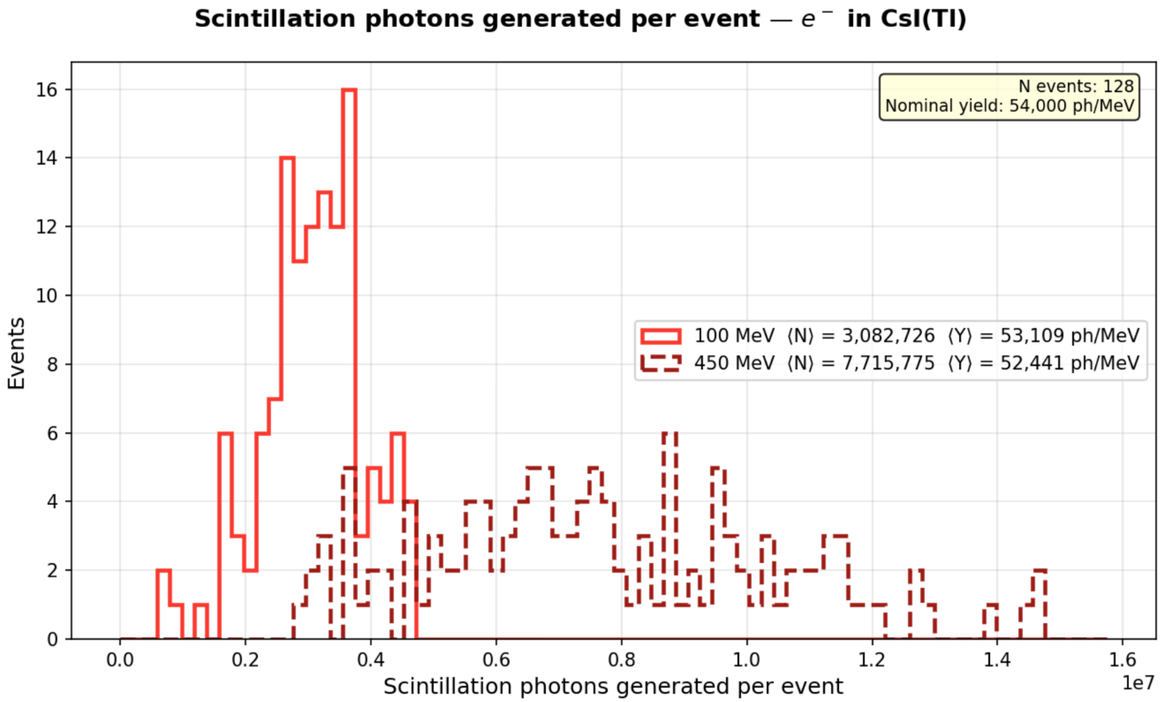
BC408 events analysis

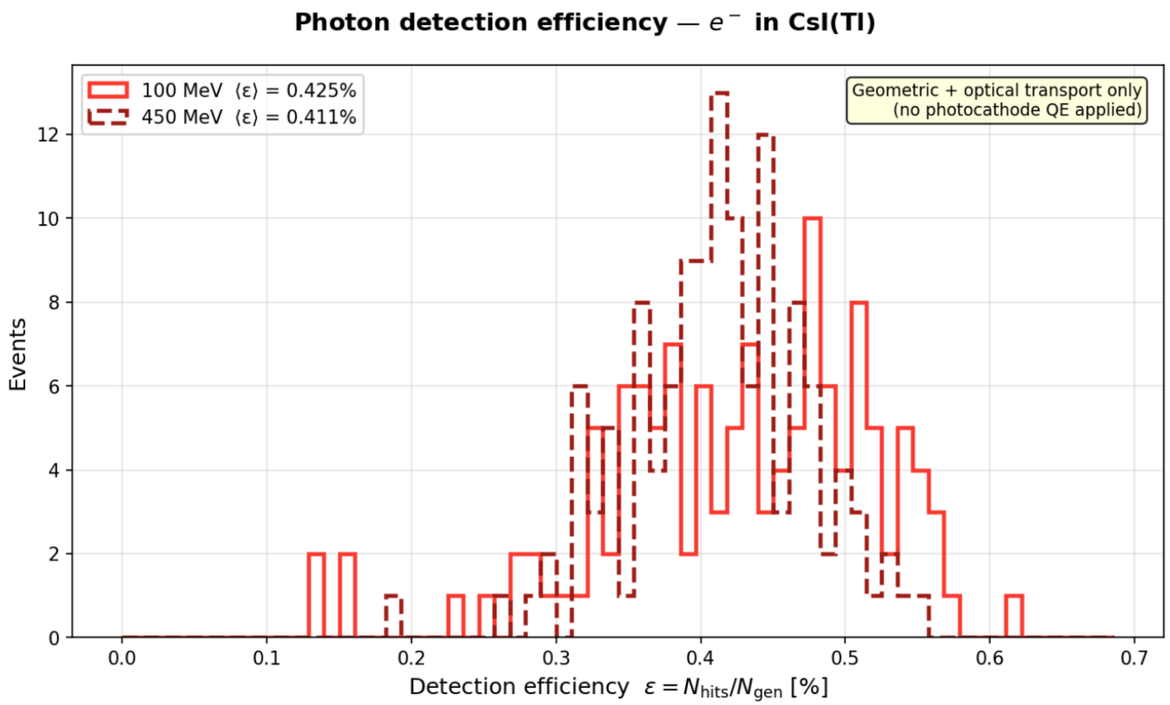


CsI events analysis

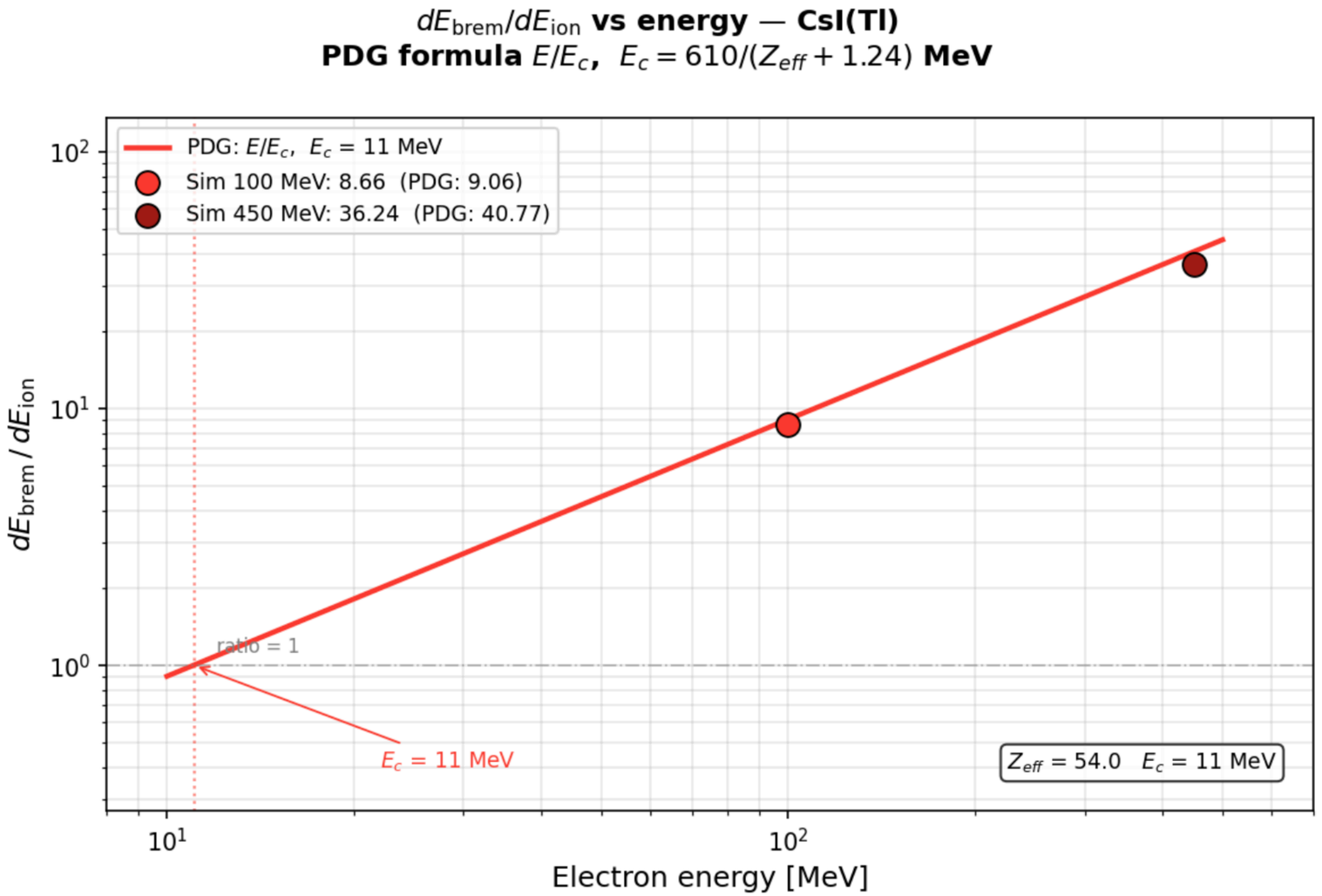


CsI events analysis





CsI events analysis

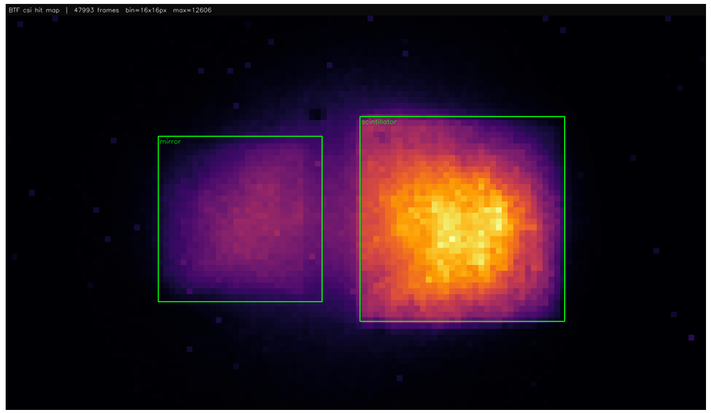


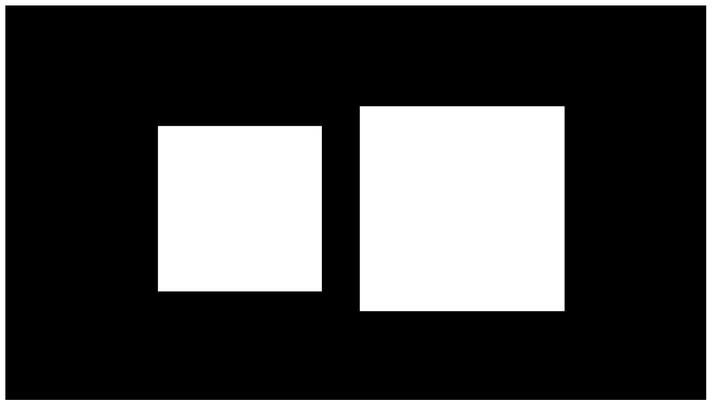
BTF Data

Dataset scan

	Acquisition directories	Period
CsI	2026_02_12_05 … _08	12 Feb 2026
BC408	2026_02_10_21 … 2026_02_11_04	10–11 Feb 2026

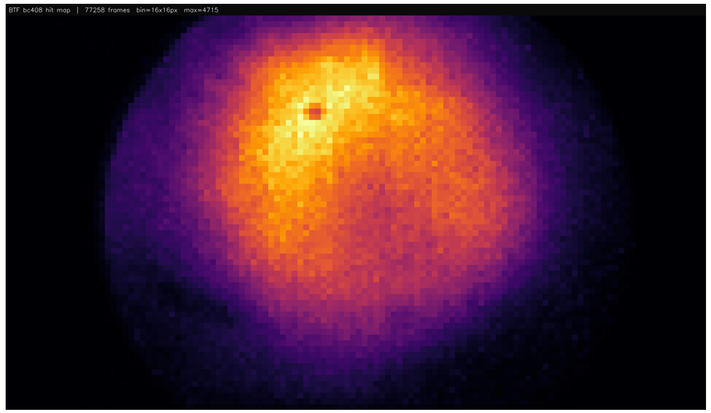
CsI + mirror mask





Sum of all images subtracting dark and flat field

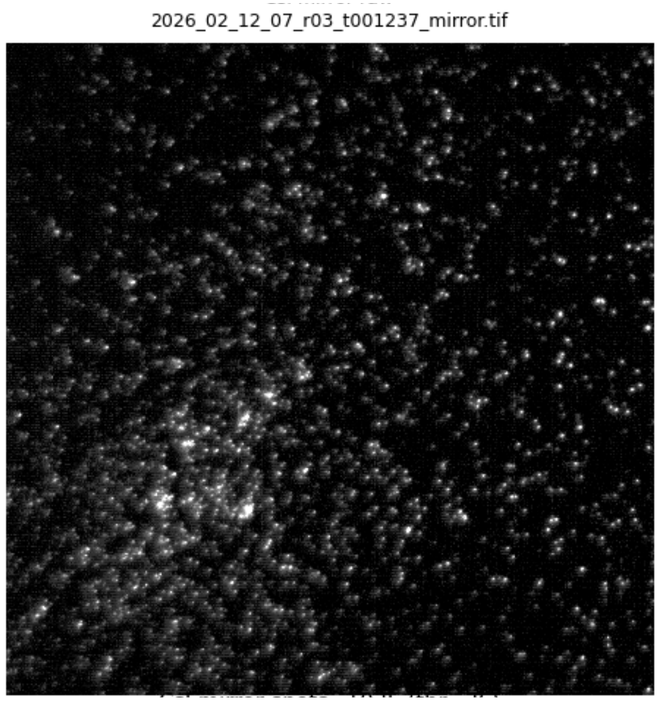
BC408 mask

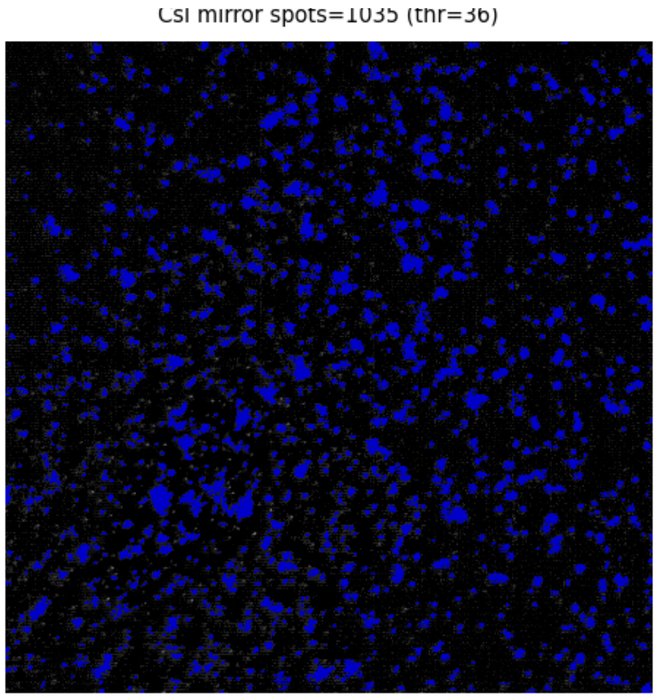


Signal selection using the blob number

```
[Blob detection / trigger classification]
     |
     ├─ CsI : fixed threshold (T=8 ADU) + 8-connected components
     |        signal if blobs_mirror≥30 OR blobs_scint≥30
     |
     |
     └─ BC408: fixed threshold (T=5 ADU) + 8-connected components
               min_area=4 px — signal if blobs≥80
```

`cv::connectedComponentsWithStats(…)`






```
Mode:         csi
Processed:    47993 / 47993
With signal:  2034
```

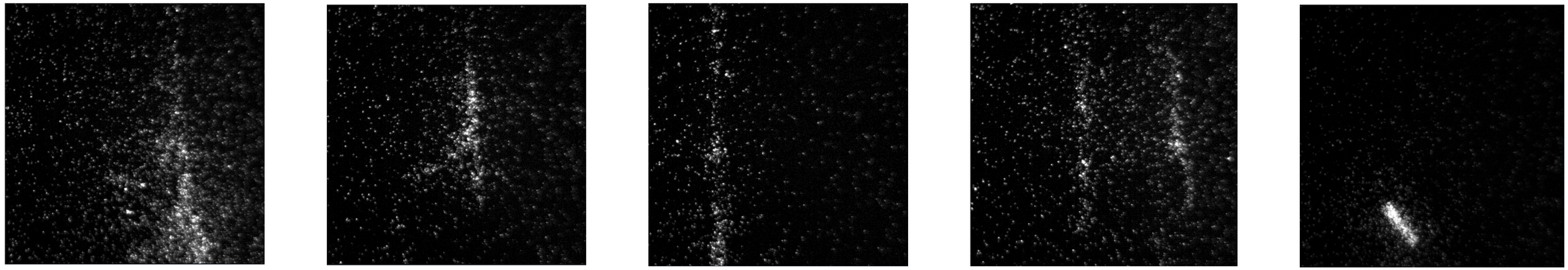
~4%

```
Mode:         bc408
Processed:    77258 / 77258
With signal:  352
```

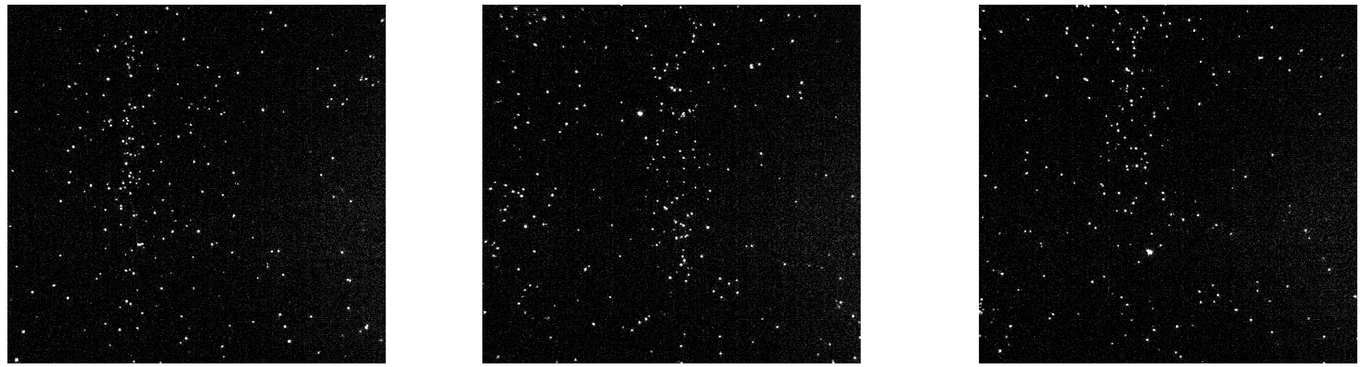
~0.5%

Examples of signal in CsI and BC408

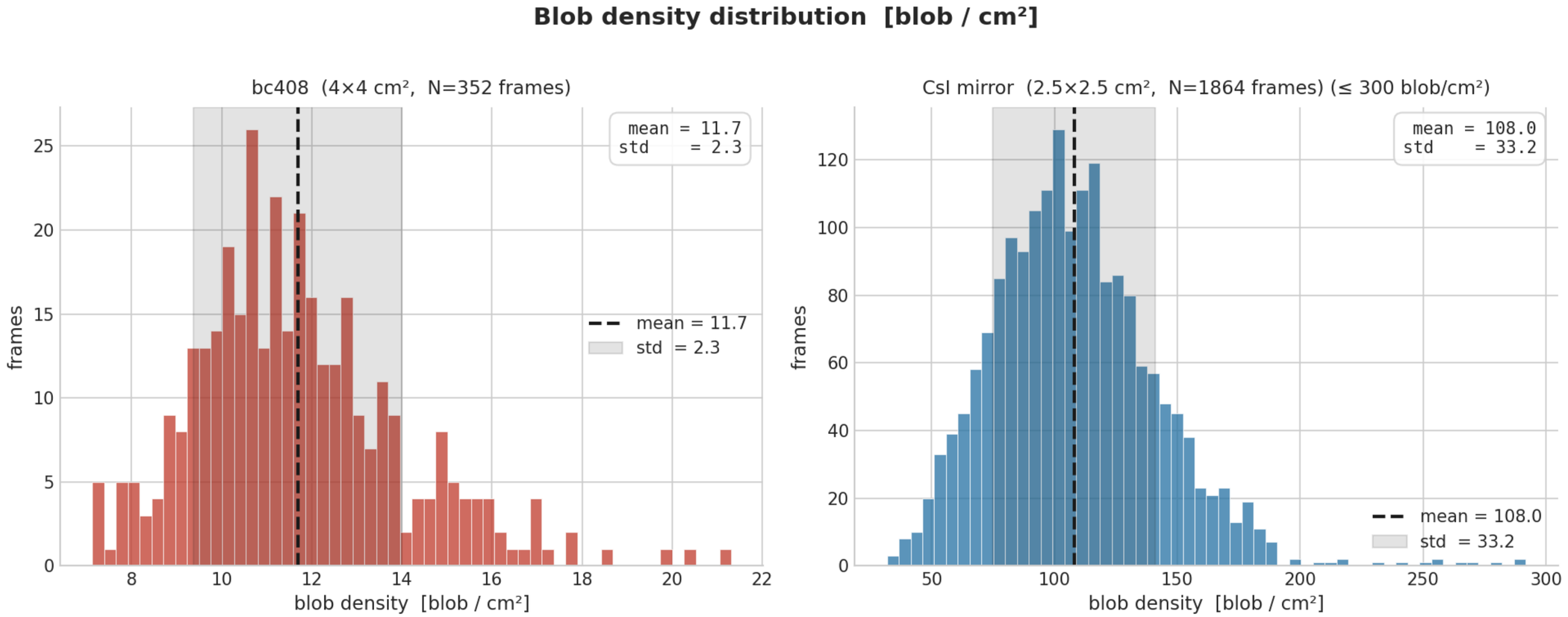
CsI



BC408



Analysis of blob number and MC comparison



The ratio of the number of blobs per cm² between the CsI and BC408 images is a factor of ~10, **consistent** with the expectations from Monte Carlo simulations

Conclusions

- Simulated tracks also for CsI(Tl) and continued the two analyses
- First analysis of the BTF dataset for BC408 and CsI number of blobs and comparison with MC dataset
- Next steps: Angle reconstruction in 2d since the track in the mirror is really faint