

# ACCELERATION OF EVENT-BUILDING FOR DATA DRIVEN HYBRID PIXEL DETECTOR DATA



## Timepix3 properties

Pixel matrix	256×256
Pixel size	55 $\mu\text{m}$ × 55 $\mu\text{m}$
Time resolution	1.56 ns

### Hybrid pixel detector

- Timepix3, throughput up to **40 MHit/s**
- Provides both **time** and **deposited energy** hit information

### Data driven output

- No transfer of zero energy (black) pixels
- Temporally unsorted

### Event building (clustering)

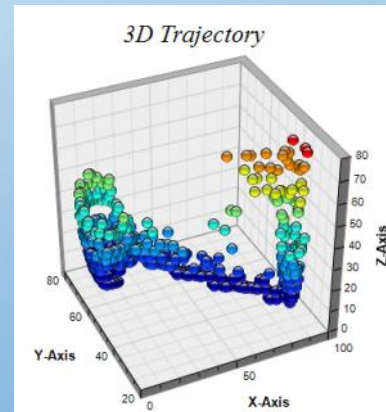
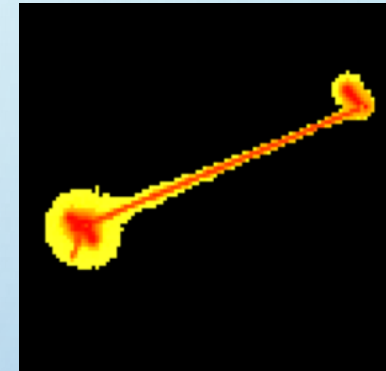
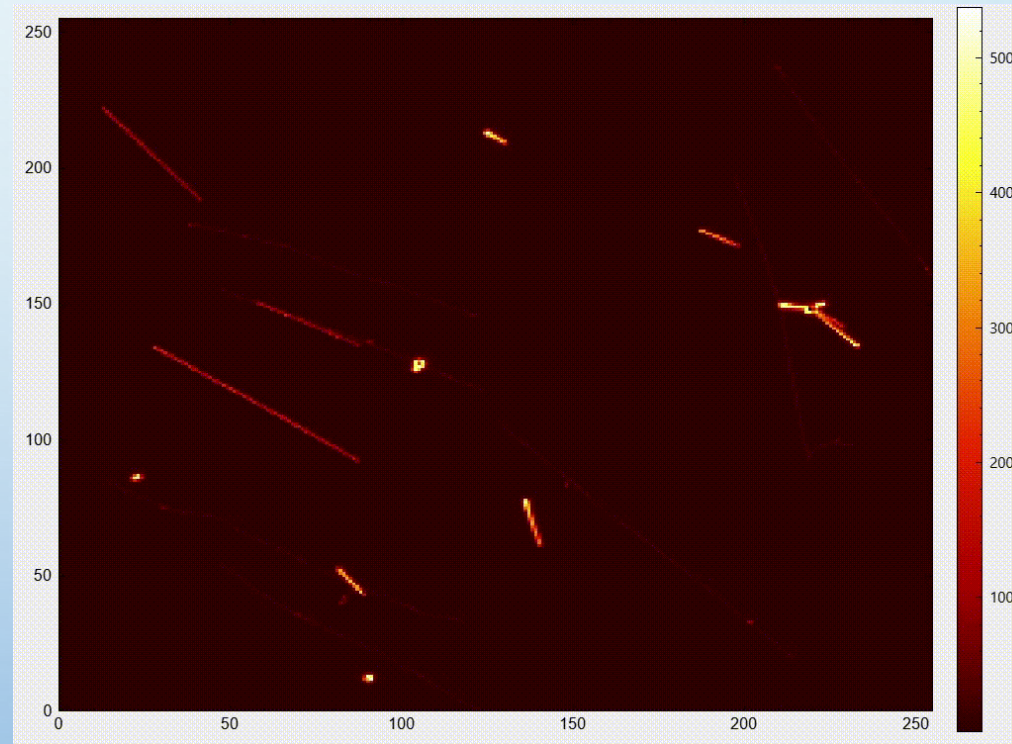
- Spatial and temporal coincident groups of pixels
- Realtime, current state of the art at **3 MHit/s**

### Acceleration – why?

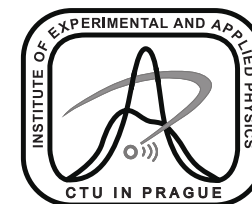
- **Until now:** Acquire → store **all** → **cluster** + analyze
- **Future:** Acquire + **cluster** → store **some** → analyze

### Acceleration – how ?

- Paralell clustering (multiple CPU cores) – split clusters?
- Selective (trigger) clustering – self initiate clustering using ML (also saves strage space)
- Feel free to stop by during poster session to find out more (+live Timepix3 demo available here) 😊



Contact us:



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