# Time-based global track reconstruction in CBM

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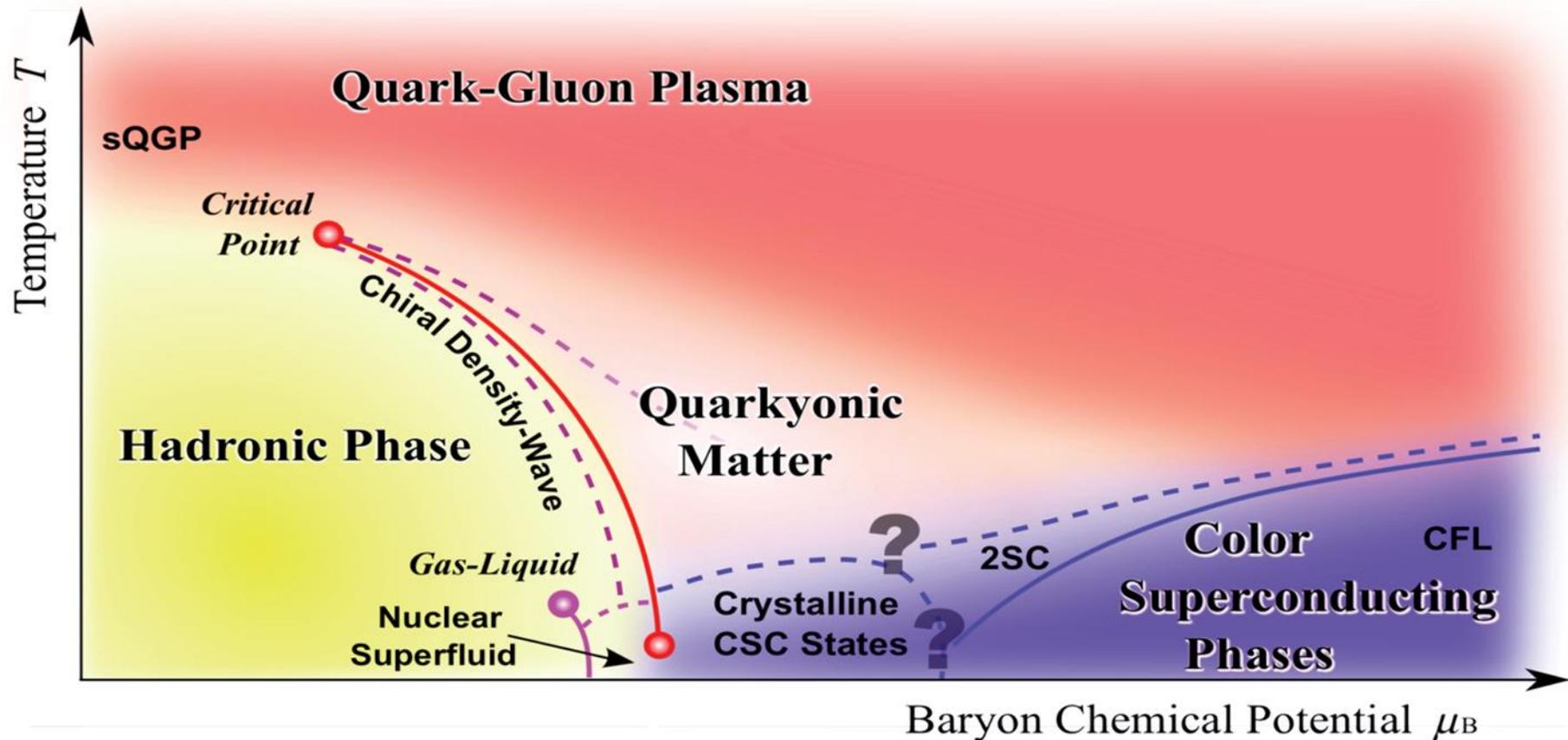
Global tracking
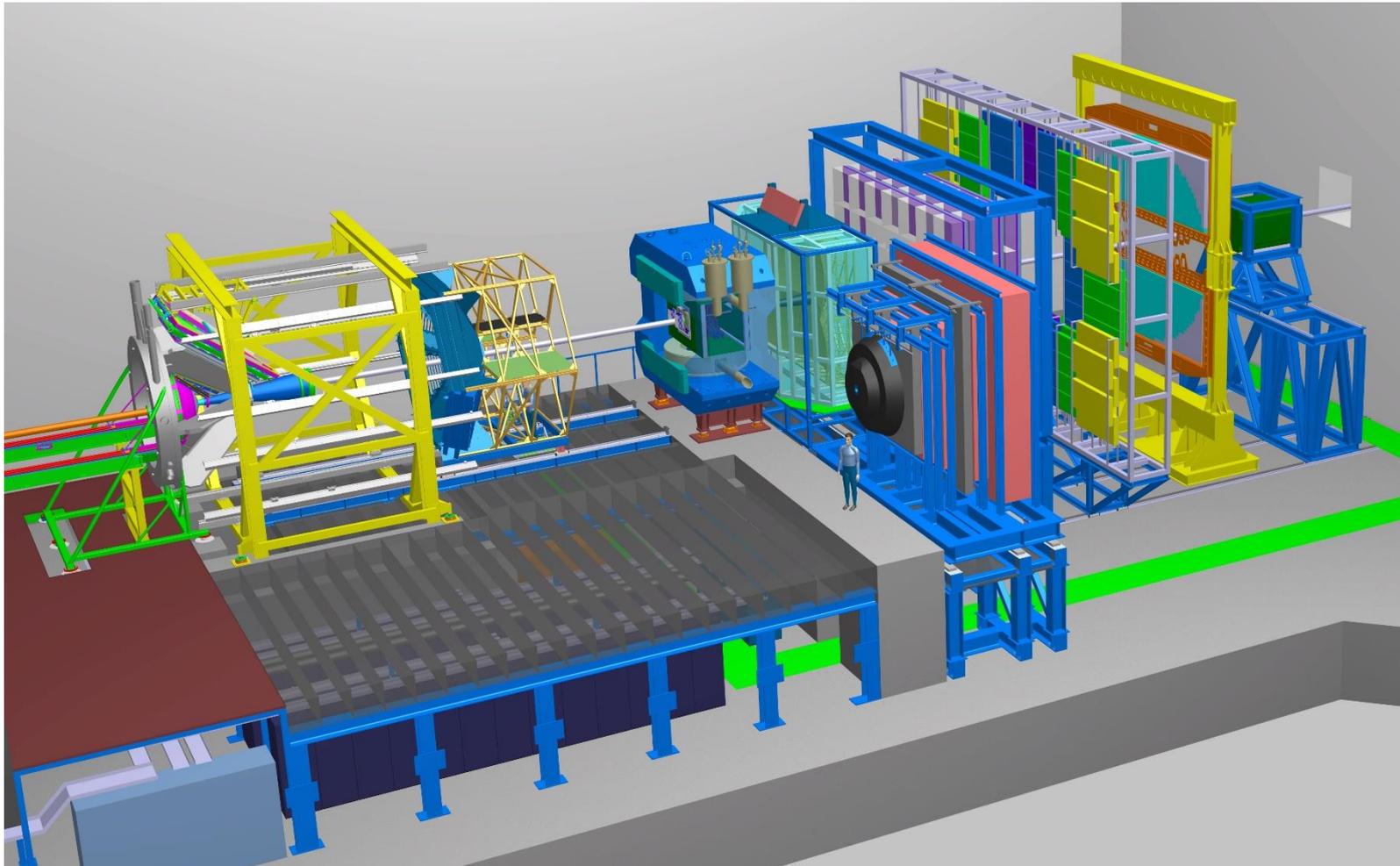
Tracking detector

- Silicon Tracking System (STS) – reconstructs tracks in the magnetic field and provides information on particles momenta.

- L1 – now works with time slices.

ToF wall geometry
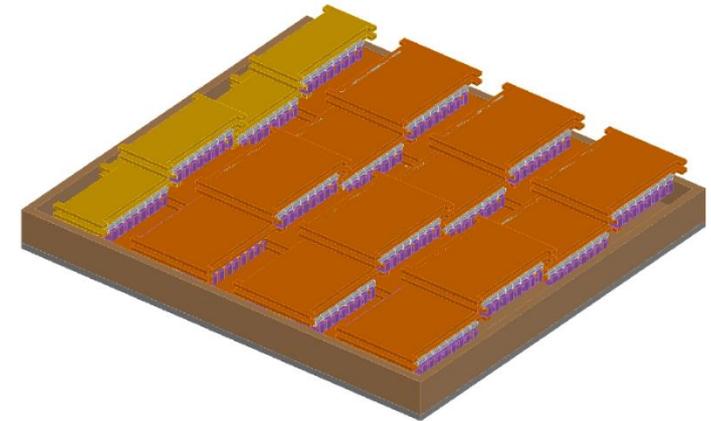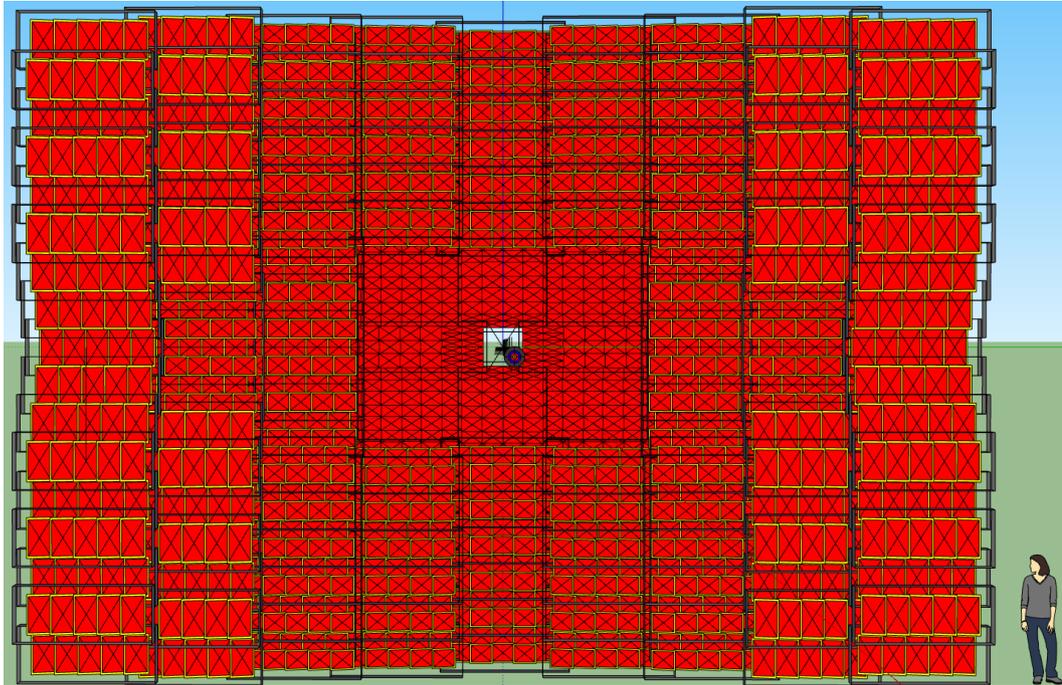
- 226 modules
- 1376 MRPCS
- 53184 channels

| M1 | M2 | M3 | M4 | M5 | M6 |
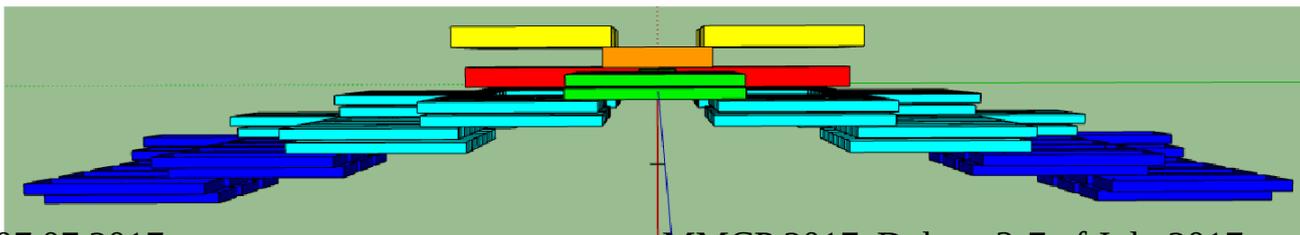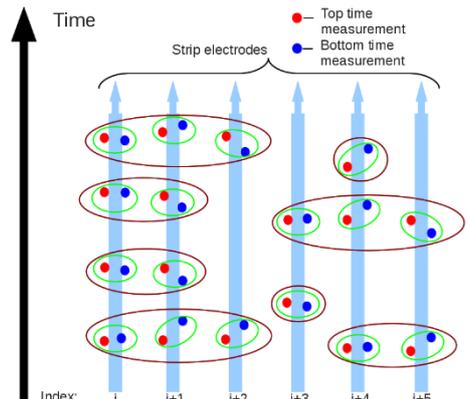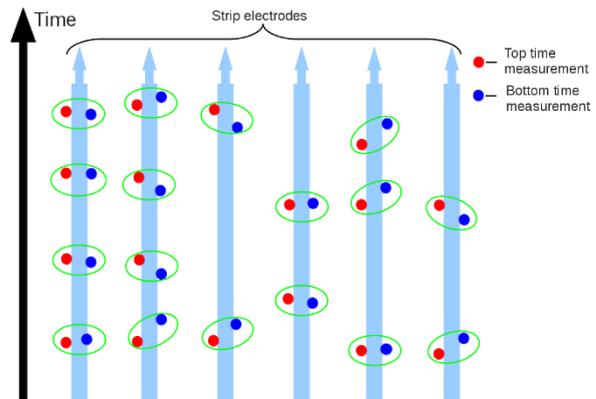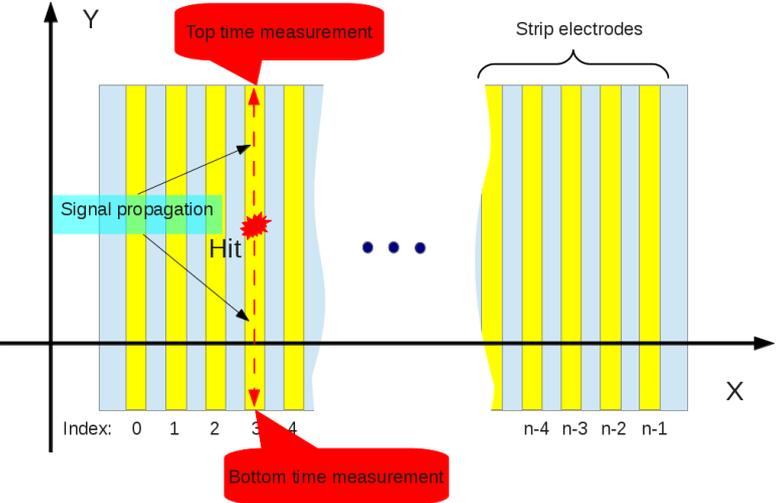
ToF clustering

ToF clustering efficiency

- The efficiency has been measured for minimum bias Au+Au@10AGeV collisions on an Intel(R) Xeon(R) CPU E5-1607 v3 @ 3.10GHz machine.

- Runtime: 4ms

- Efficiency: 97%

Two approaches

1.Binned tracker

2.Littrack

Binned tracker

- Applies an approach developed for standalone triggerings of the $J/\psi \to \mu^+\mu^-$ and $J/\psi \to e^+e^-$ decays.

- Each detecting station is represented as a 3-d (if it is plane) or 4-d cuboid and subdivided to smaller cuboids of the same dimensions to accelerate hit correspondence establishing.

3-d bins
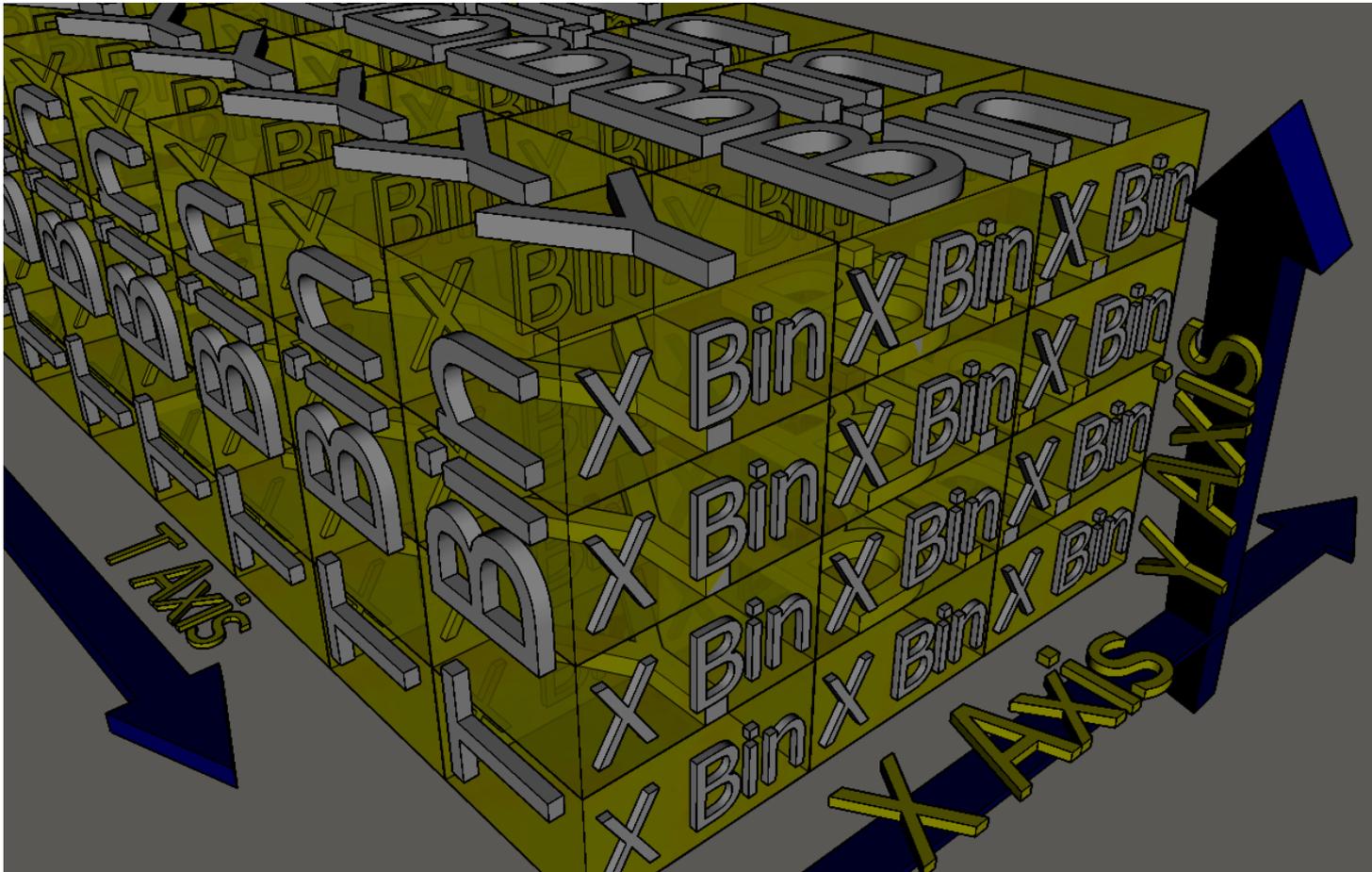
# 3-d bins neighbourhood
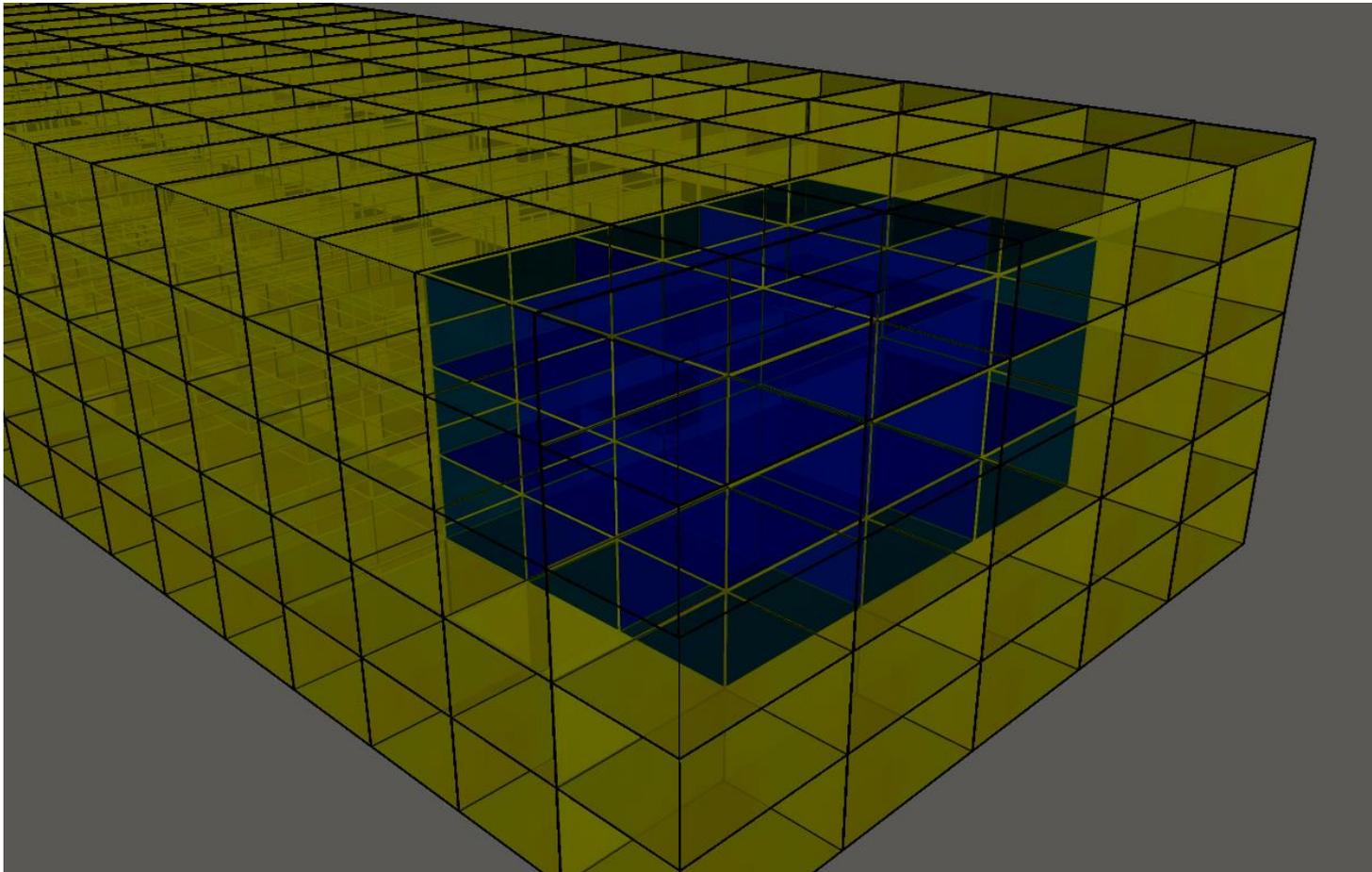
4-d bins
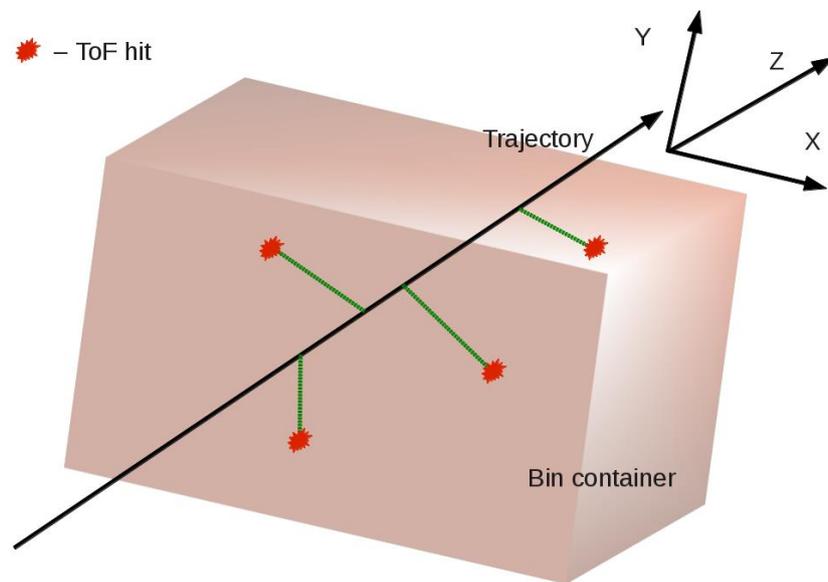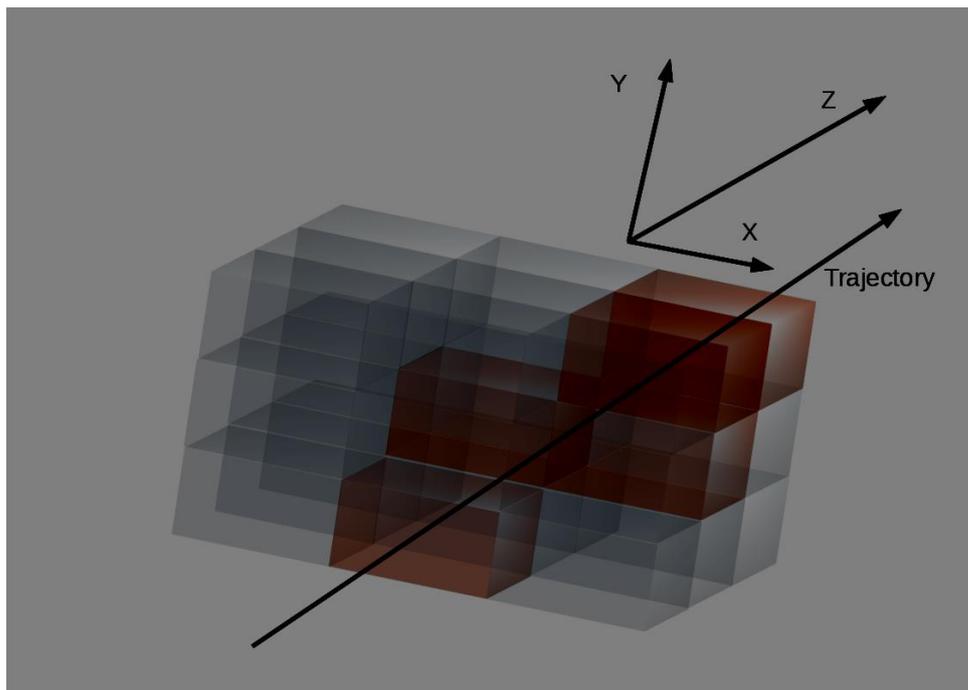
Binned tracker efficiency

- Intel(R) Xeon(R) CPU E5-1607 v3 @ 3.10GHz machine.

- 93% ToF hit linking efficiency for minimum bias Au+Au at 10 AGeV collisions, simulated with URQMD.

- 14 ms per event.

Littrack

- The state vector and the covariance matrix have been upgraded with time components.

- Kalman procedures have been upgraded.

- Littrack QA has been upgraded.

- Matching of the reconstructed to MC information procedures have been upgraded.

Littrack efficiencies

- 93% ToF hit linking efficiency for minimum bias Au+Au at 10 AGeV collisions, simulated with URQMD.

- 88% track reconstruction efficiency in MuCh, for muons, generated with the Box generator, with momenta in the range 5 – 15 GeV/c.

- Problems when used both MuCh and ToF – under investigation.