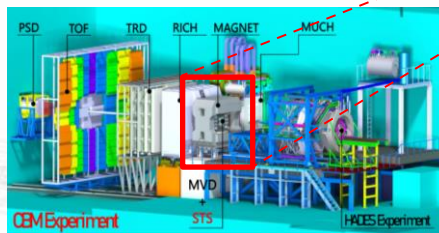
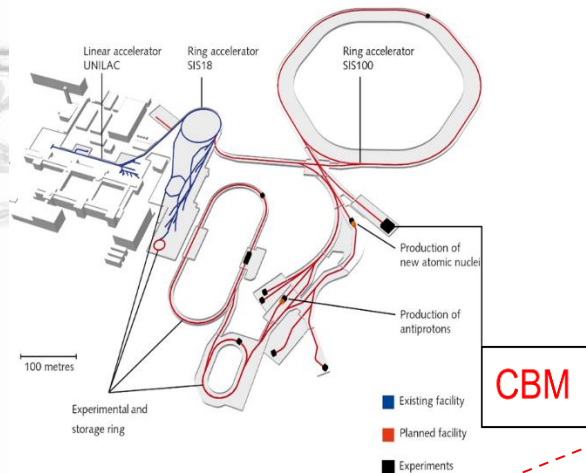


## Abstract

The Compressed Baryonic Matter (CBM) is one of the experimental pillars at the FAIR facility. CBM focuses on the search for signal of the phase transition between hadronic and quark-gluon matter, the QCD critical endpoint, new forms of strange-matter, in-medium modifications of hadrons, and the onset of chiral symmetry restoration.

The Silicon Tracking System is the central detector for momentum measurement and charged-particle identification. It is designed to measure Au+Au collisions at interaction rates up to 10 MHz. It consists of approximately 900 double-sided silicon strip sensors with 1024 strips per side, arranged in 8 tracking stations. This results in 1.8 million channels, having the most demanding requirements in terms of bandwidth and density of all CBM detectors. In the context of FAIR phase 0, the mini-CBM (mCBM) project is a smallscale precursor of the full CBM detector, consisting of sub-units of all major CBM systems which aims to verify CBM's concepts of free-streaming readout electronics, data transport, and online reconstruction. In the 2021 beam campaign at SIS18 (GSI) O+Ni collisions at 2 AGeV were measured with a beam intensity up to 1010 ions per spill. The mini-STs (mSTS) setup used for the 2021 campaign consists of 2 stations with 11 sensors. First results obtained from data taken in the 2021 beam campaign will be presented with a focus on the hit reconstruction and mSTS performance studies.

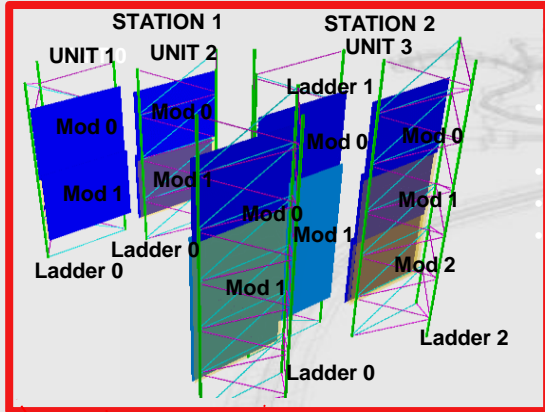


Ongoing Construction

**Compress Baryonic Matter:** challenging experiment (free streaming data, high rates)

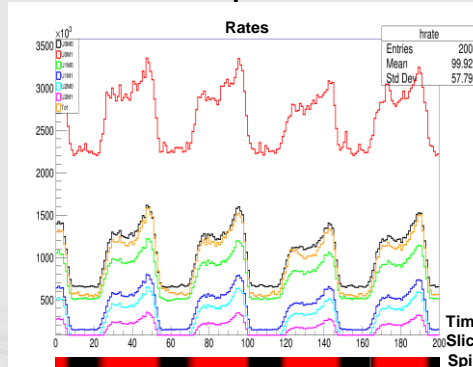
**Silicon Tracking System:** 1.8 million channels -> the most demanding requirements in terms of bandwidth and density of all CBM detectors

## mini-Sts(mSts) Setup: mini-CBM(mCBM) 2021 Campaign



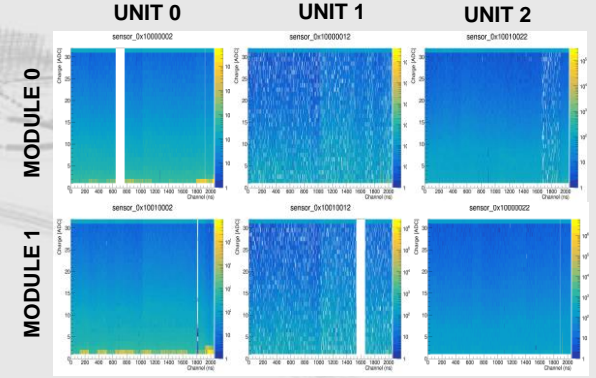
**U0 (Station 1), U2(Station 2)** (except 2 ASICs)  
**U1 (Station1):** issue with calibration  
**U3 (Station2):** switched off:

**10<sup>10</sup> ions per spill: ~500 kHz**  
**interaction rate**  
**2 tracking stations**  
**4 units**  
**11 modules: double-sided double-metal micro-strip silicon sensors**

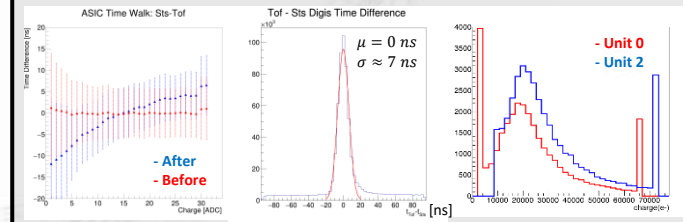


**InSpill: effective length 7.5-8 s (1TS=256us)**  
**OffSpill**

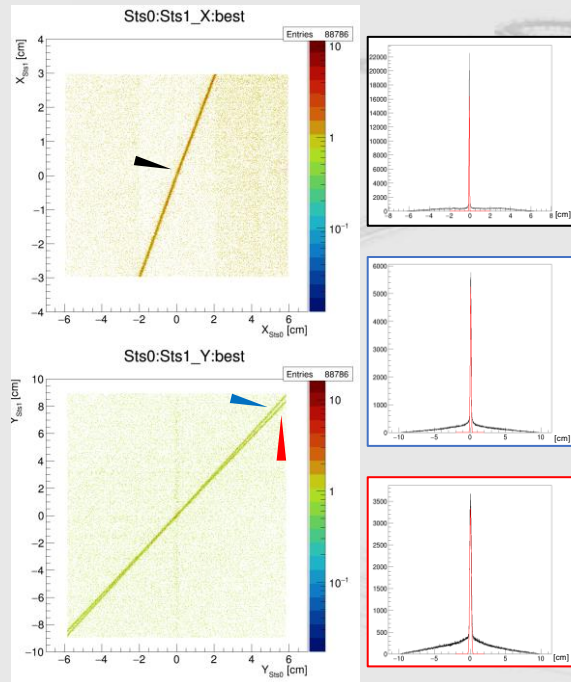
## Charge vs Channel per module



## Time & Charge Calibrations

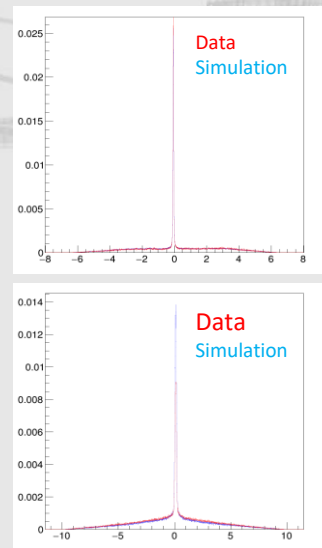


## mSts:mSts Correlations



Only hit pairs closest in time

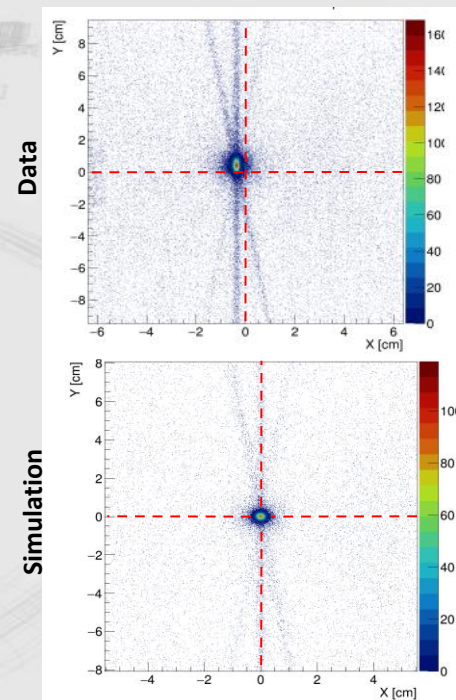
## Monte Carlo expectations



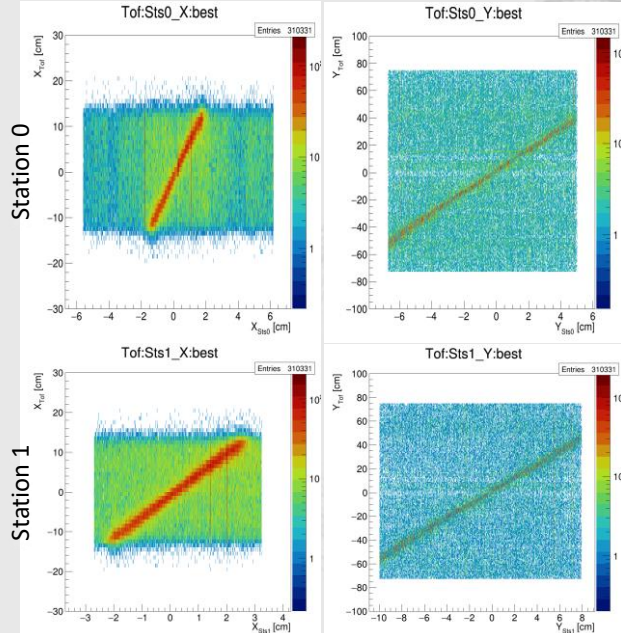
	$\sigma_{XX}$ cm	$\sigma_{YY(0)}$ cm	$\sigma_{YY(1)}$ cm
Simulation	0.0280(2)	0.0603(6)	0.1063(13)
Data(run 1588)	0.0280(3)	0.0655(7)	0.1099(16)

Table 1: Standart Deviation for the fitted peaks.

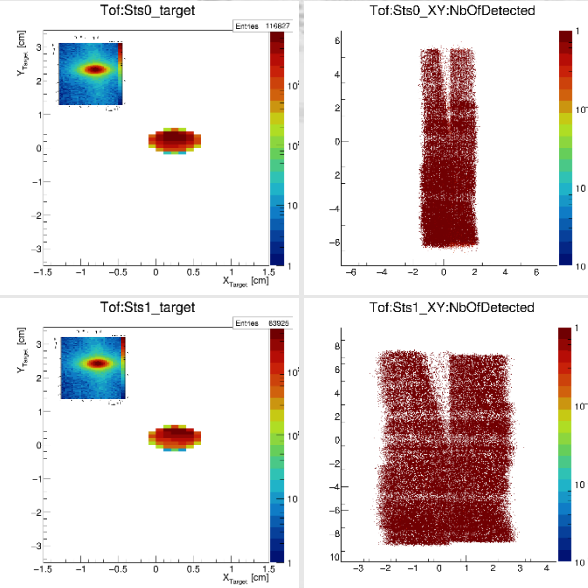
## Target extrapolations



## mSts:mTof Correlations



## Reconstruction Efficiency



## Summary & Outlook

**Detector:** prototype of STS (“mSTS”) constructed and installed according to the design

**Data taking:** generally ok (short commissioning time with new readout system), some issues with detector operation investigated and understood

**Reconstruction analysis chain:** calibration (noise, time, charge) + reconstruction (unpacker, cluster finder, hit finder, event builder) works well.

**Geometrical alignment of the setup:** first time developed, excellent results → STS performance (time resolution, space resolution) inline with expectations (simulations).

**To do:** hit reconstruction efficiency dependence on thresholds (using 2-out-of-3 method with 2 Sts stations and Tof)