The powering concept for the Silicon Tracking System of Compressed Baryonic Matter experiment at FAIR

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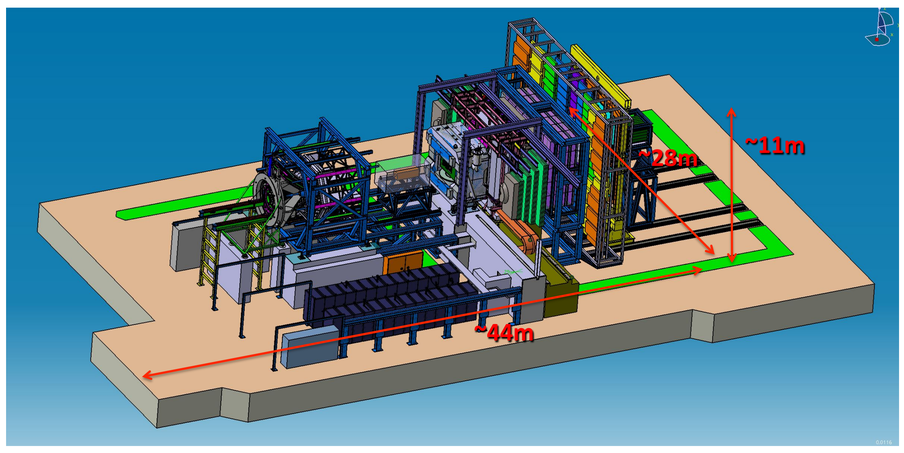
The CBM experiment at FAIR/GSI

Compressed Baryonic Matter experiment:
fixed target heavy ion physics Experiment @ FAIR/GSI:

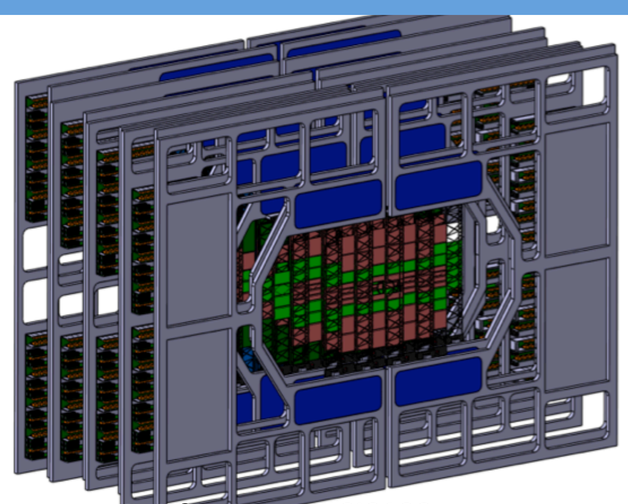
- **high interaction rate**
- **high radiation dose on the electronic components**
- **1T magnetic field**



- fixed target setup to investigate the QGP phase diagram in region of high baryon-densities
- very high interaction rate environment: 10^5 - 10^7/s (A+A), up to 10^9/s (p+A)
- allows to study the equation-of-state of nuclear matter at neutron star core densities and the search for phase transitions, chiral symmetry restoration and exotic forms of QCD matter

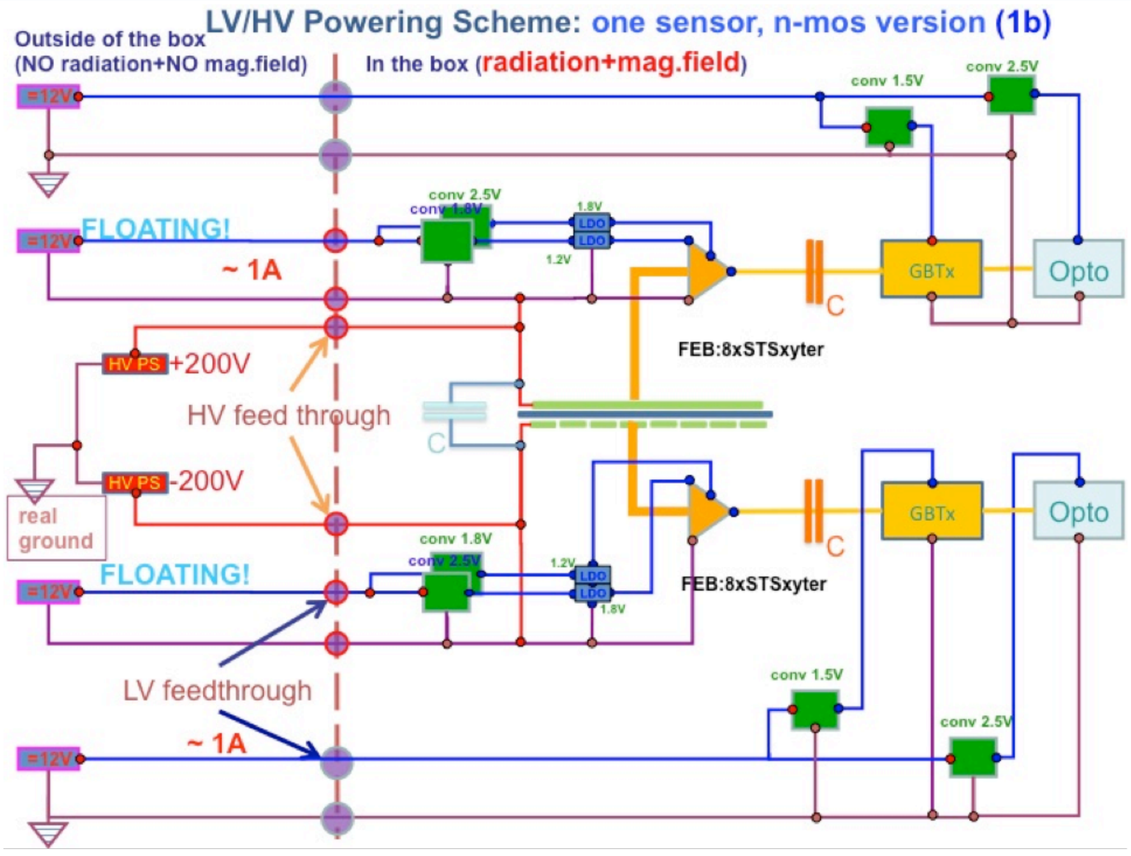
Silicon Tracking Station detector for CBM

- Compact (volume ~3.5 m^3) Silicon Tracking Station sub-detector consisting of 900 double sided silicon strip sensors (4 m^2 sensitive area in 8 layers) placed in a strong (1T) magnetic field for momentum measurement
- requires radiation tolerant electronics and materials
- magnetic field resilient components
- efficient voltage converters to reduce heat production inside the detector and short and low ohmic connections inside STS
- 1800 LV and 1800 HV channels for floating individual powering of sensors and readout electronics



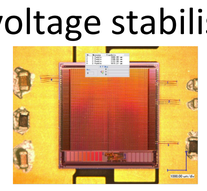
STS for CBM at SIS100

Single silicon sensor powering

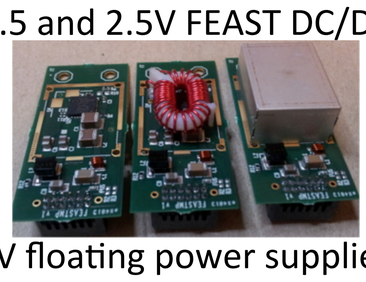


Low voltage components

- 1.2V, 1.8V low drop voltage stabilisers developed in SCI Chandigarh India



- 1.8V, 2.4V, 1.5 and 2.5V FEAST DC/DC converters developed at CERN



- driven by 12V floating power supplies from outside (~1800 channels, commercially available)

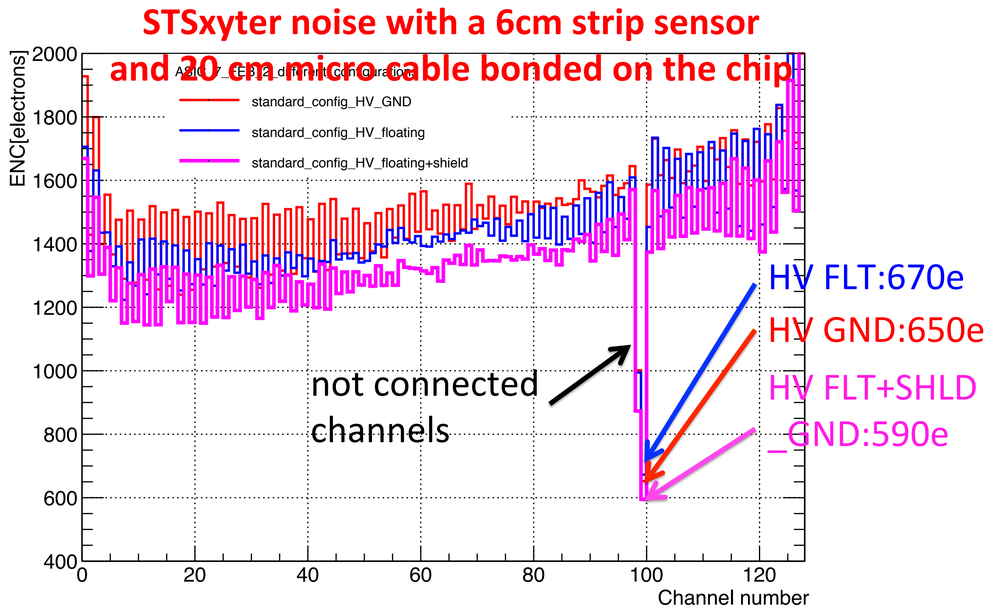
High voltage requirements

- 500 V/ few mA floating power supplies with pairwise common ground, placed some 100 m from the pit (~1800 channels, commercially available)

Activities at GSI:

LV + HV noise measurement results

STSxyter noise with a 6cm strip sensor and 20 cm micro cable bonded on the chip



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DC/DC: CERN S.Michelis et al. https://project-dcdc.web.cern.ch/project-dcdc/public/Documents/FEASTMod_Datasheet.pdf

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http://www.wiener-d.com/sc/power-supplies/mpod--lvhv/mpod-hv-module.html
http://www.wiener-d.com/sc/power-supplies/mpod--lvhv/mpod-crate.html

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