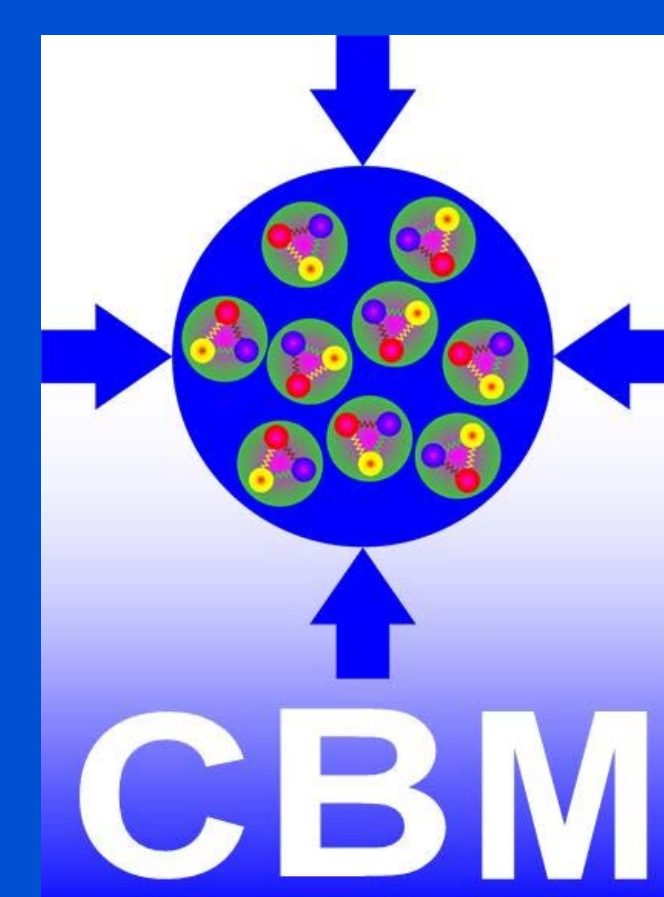
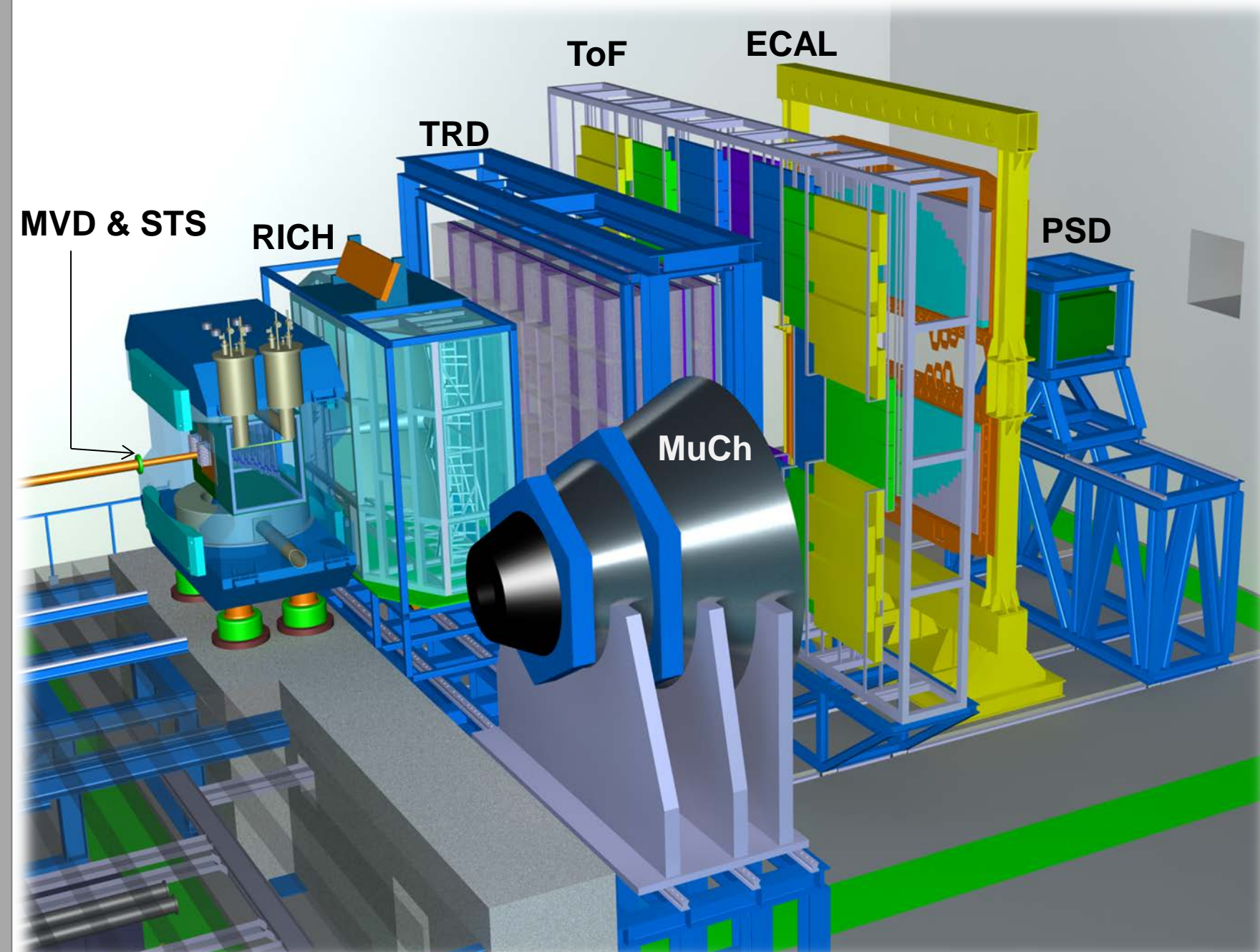


Integration of the Silicon Tracking System for the CBM experiment at FAIR

GSI, for the CBM Collaboration

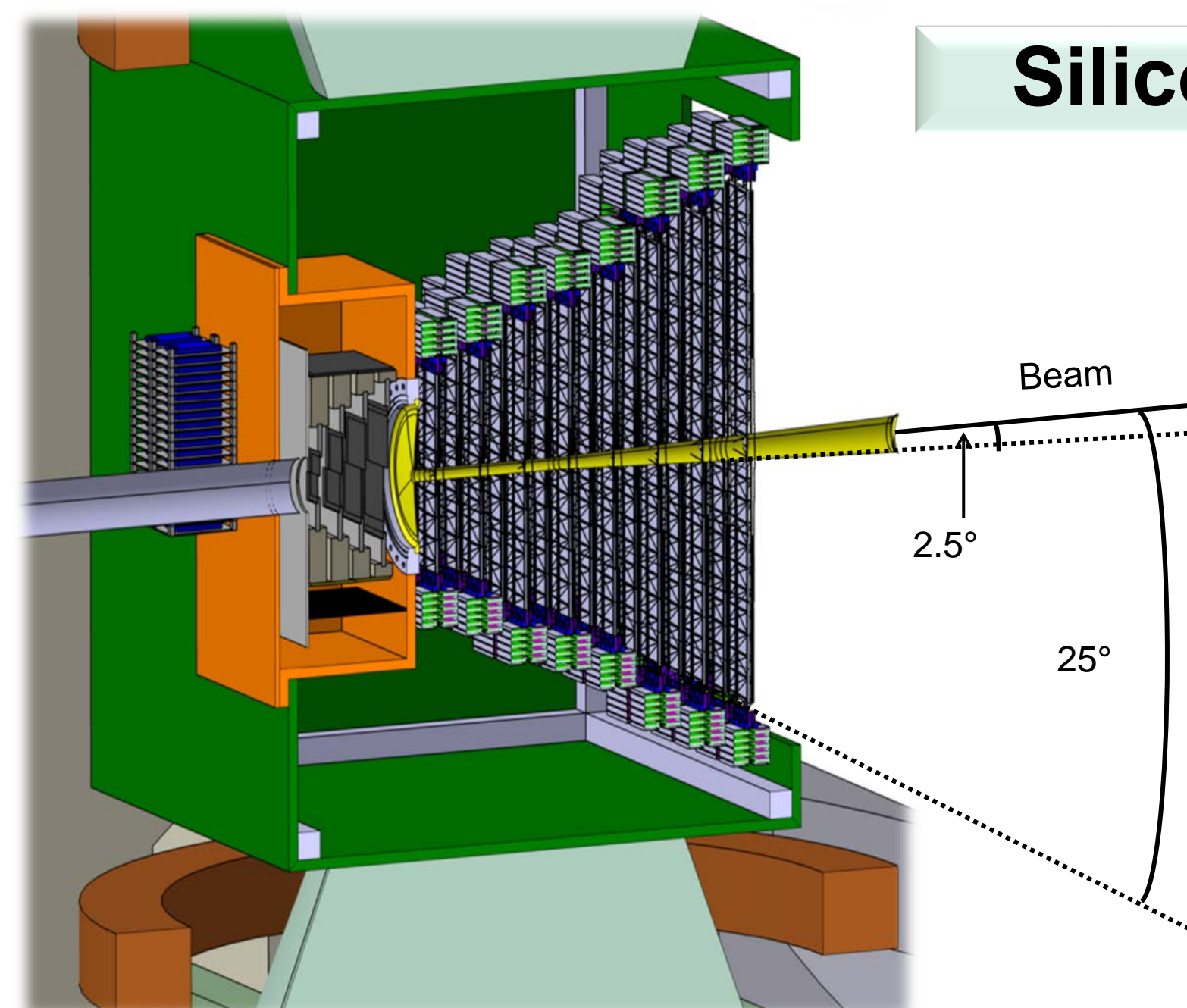


The CBM experiment and technical designs of STS



Compressed Baryonic Matter experiment:

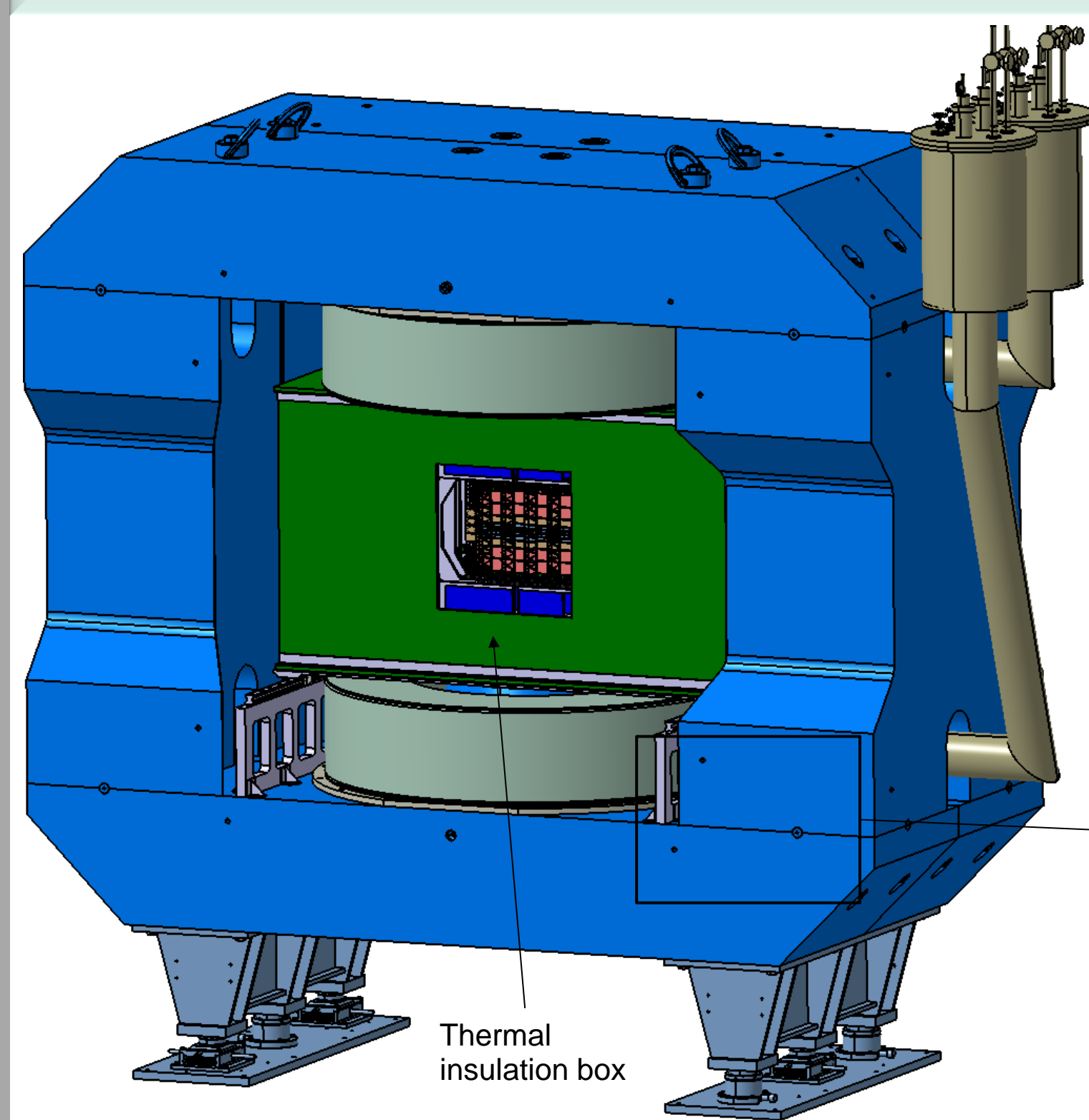
- stationary target
- 2 – 45 AGeV
- explore QCD phase diagram the region of high baryon densities and moderate temperatures
- study of the equation-of-state of nuclear matter at high densities
- search for the de-confinement & chiral phase transitions
- measure both bulk observables & rare diagnostic probes (charmed particles, vector mesons)



Silicon Tracking System

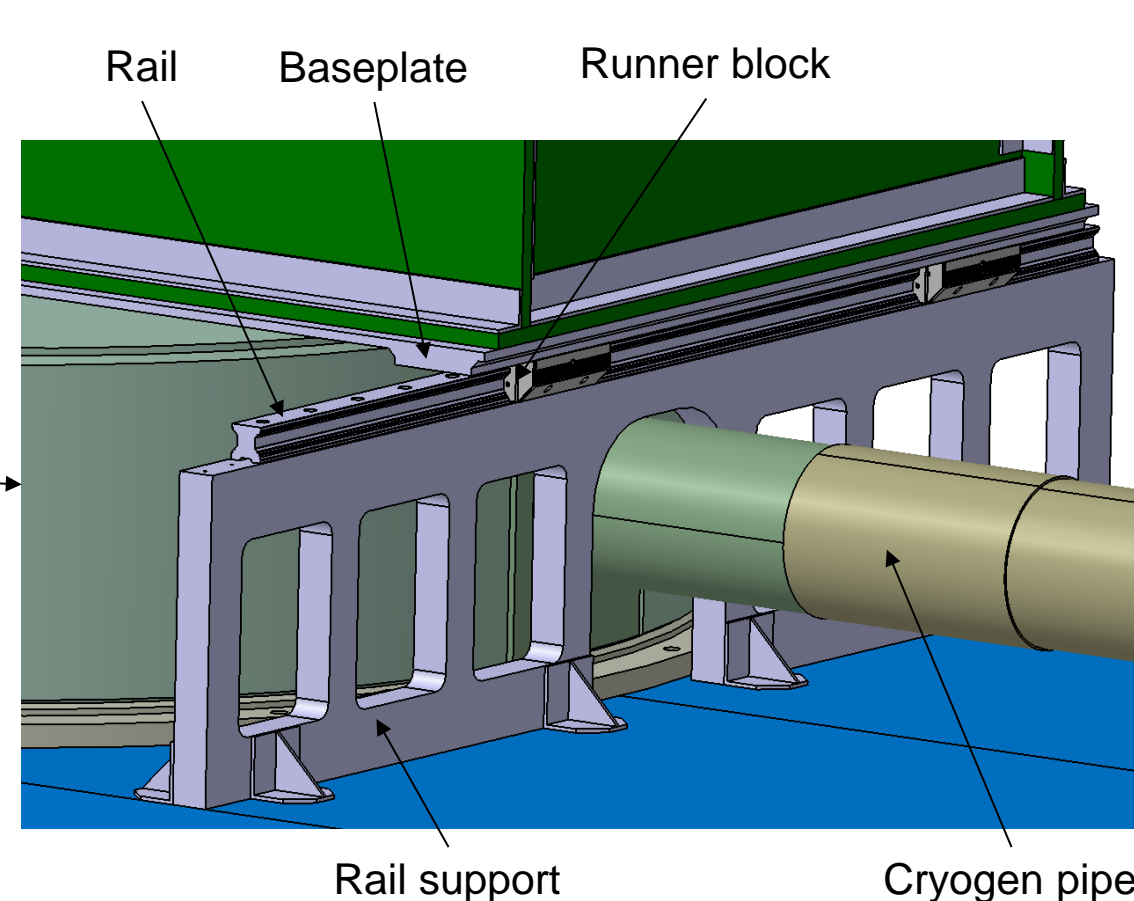
- 8 tracking stations
- double-sided micro-strip silicon sensors
- minimized number of channels
- minimized material budget
- read-out electronics outside the physics aperture

STS in the magnet

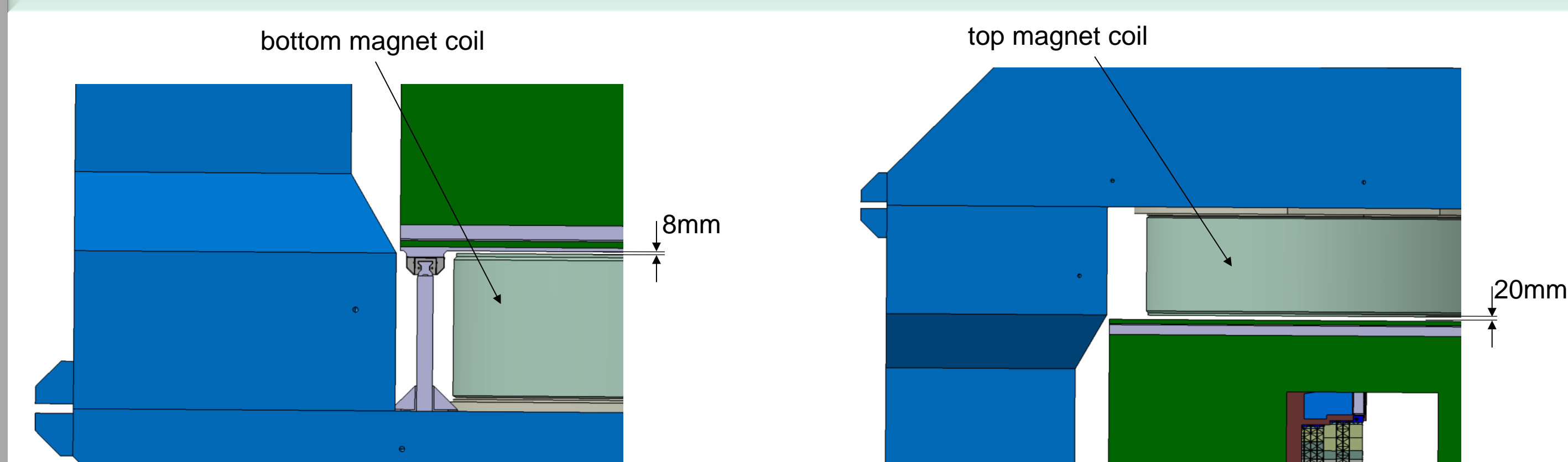


Rail system:

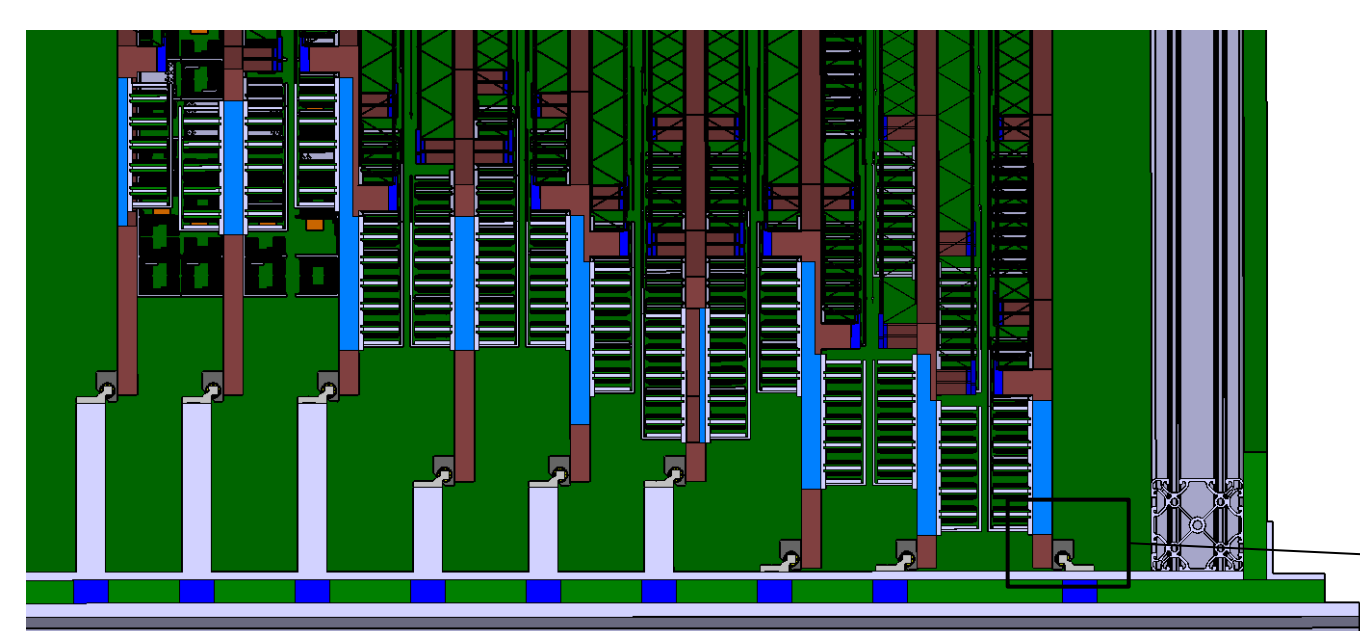
- rail support on the magnet floor
- rigid and highly precise system
- easy mounting and positioning of the STS



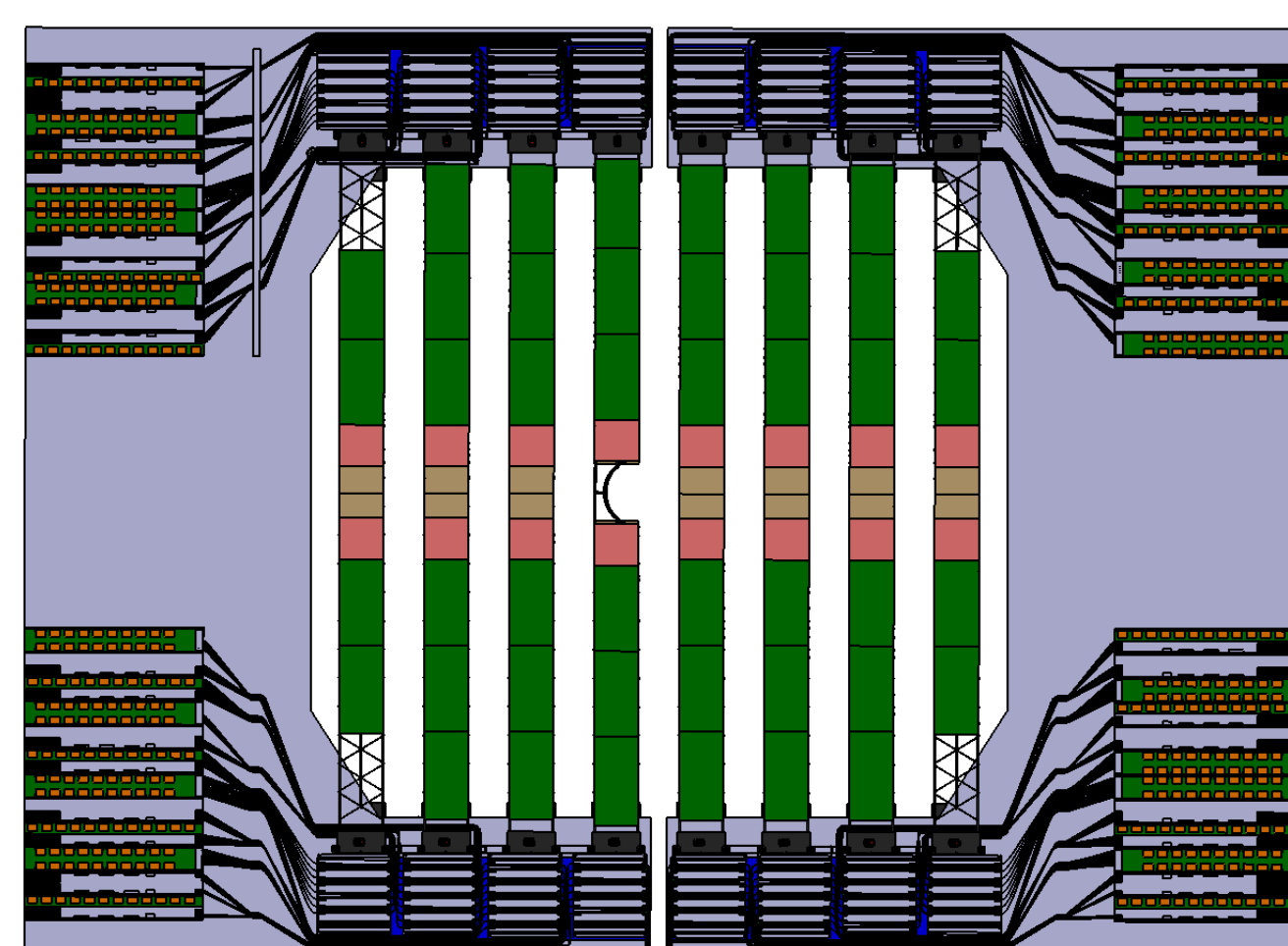
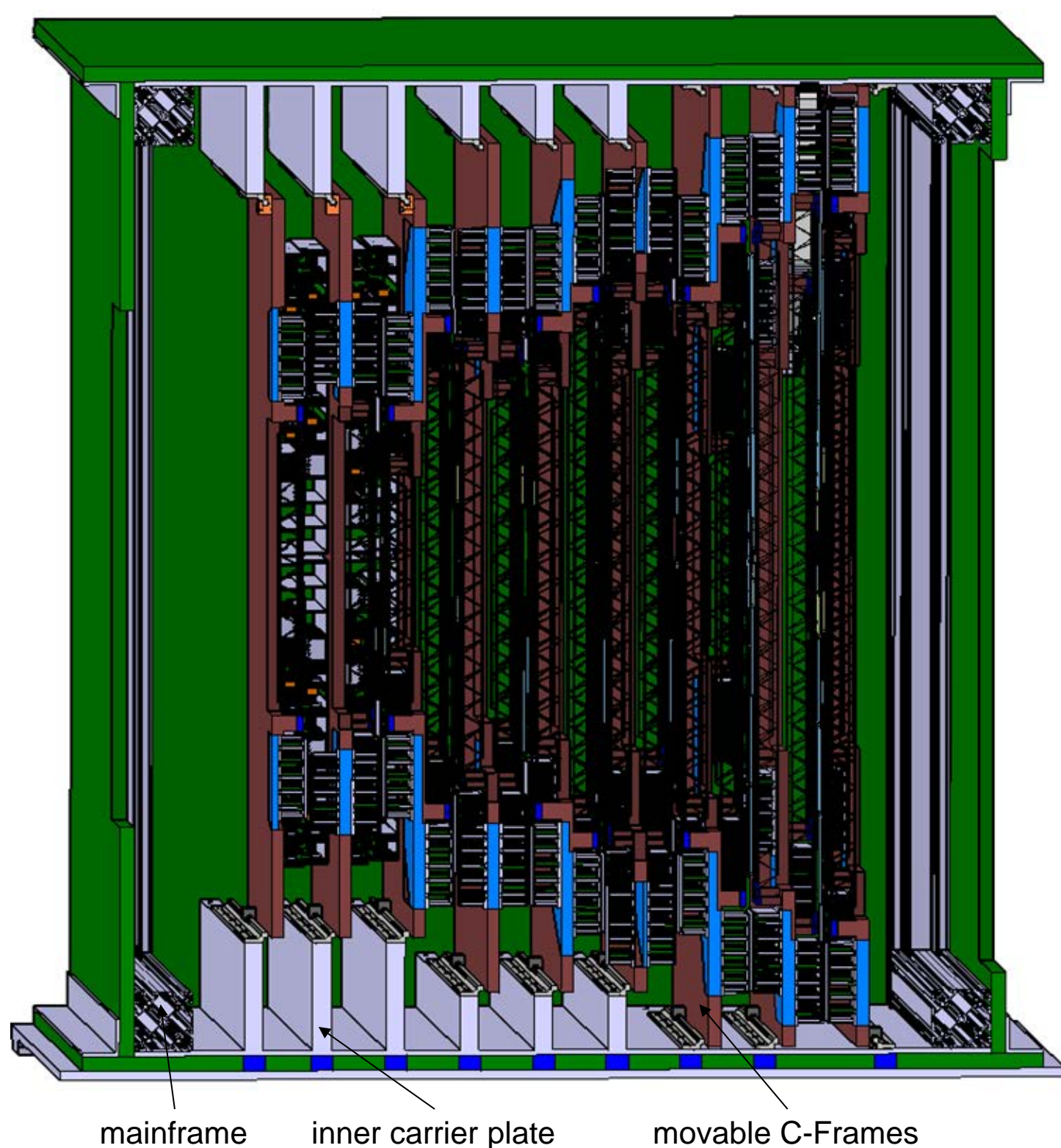
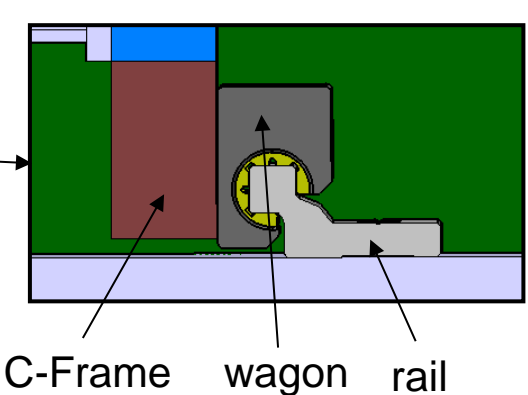
Critical distances



Layout of STS stations



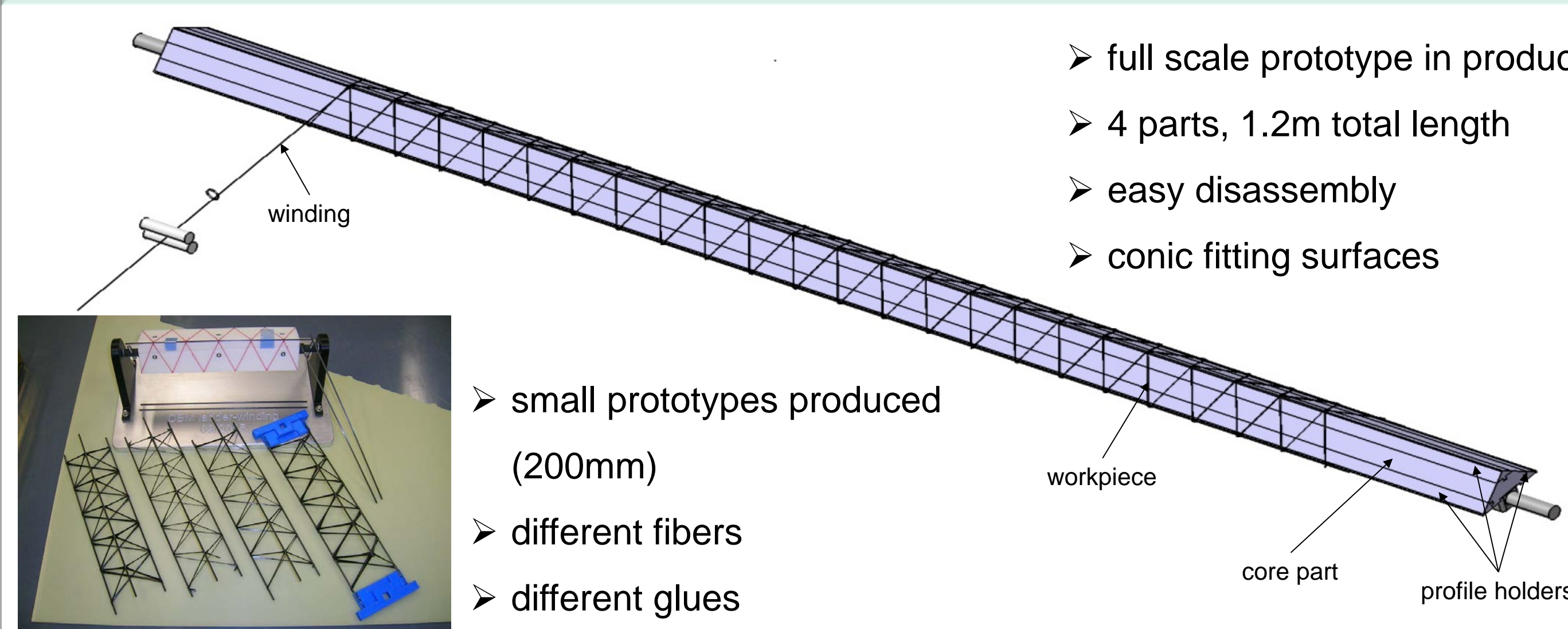
- C-Frames are carried by the rail system
- inner carrier structure for maximal stiffness
- lateral disassembly possible



C-Frames are carriers for the:

- carbon ladders
- cables
- front end electronics
- cable distributors
- peripheral electronics
- electronic coolers

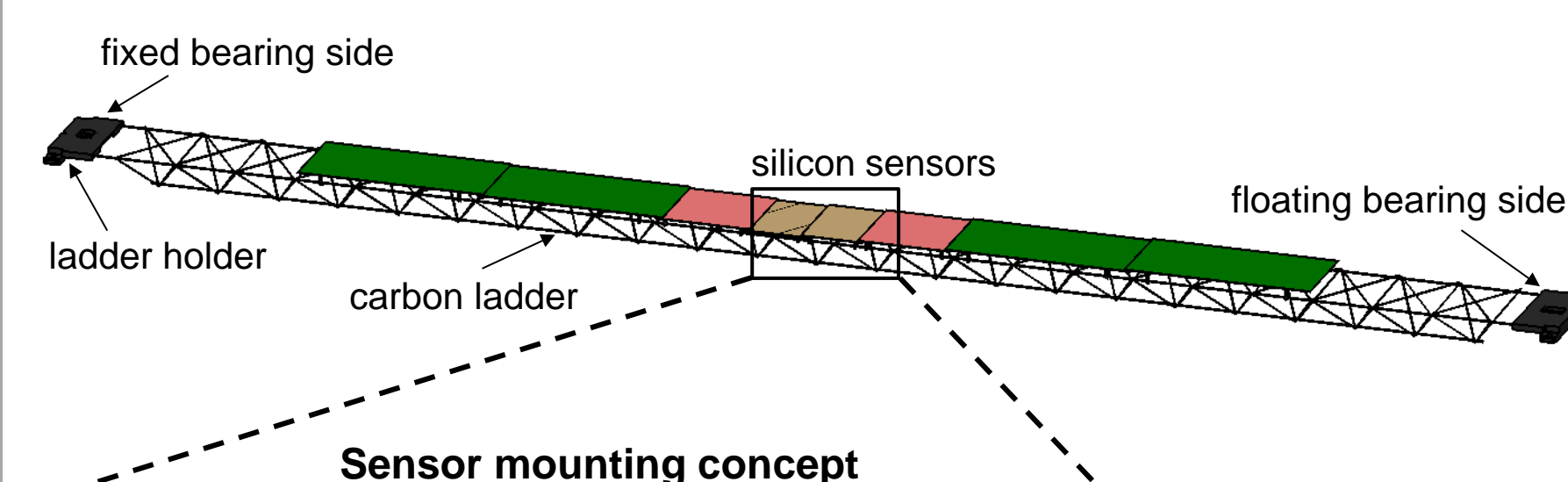
Winding tools and prototypes



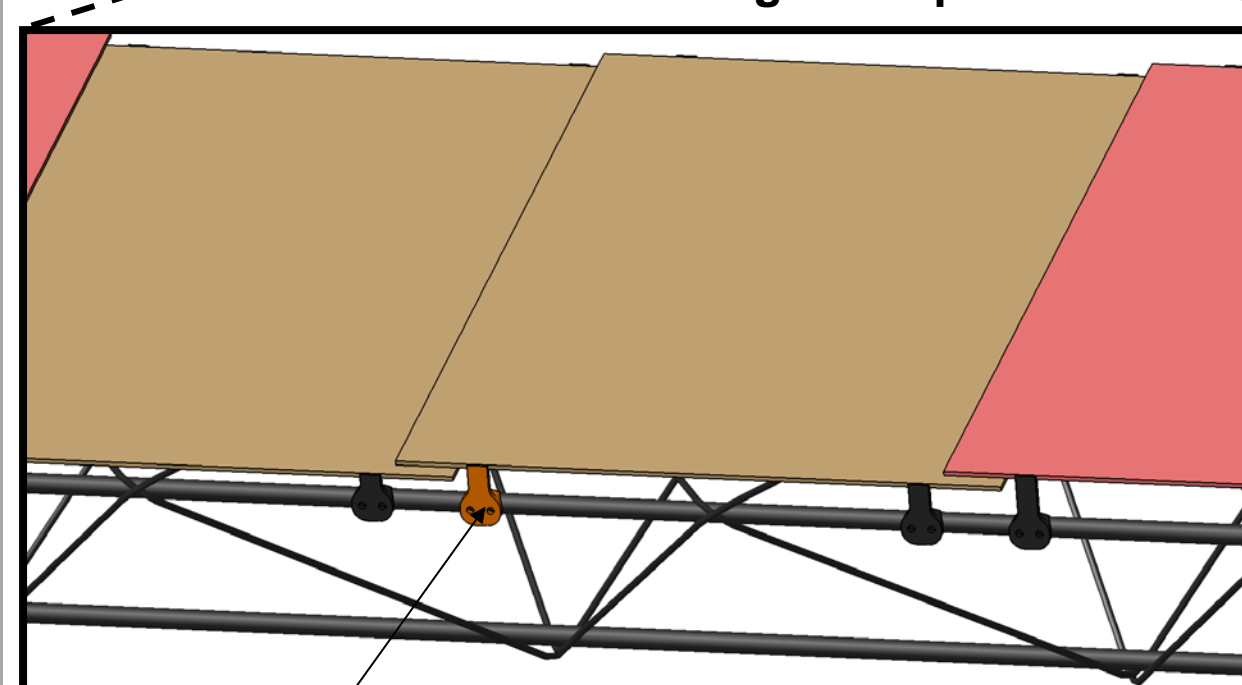
- full scale prototype in production
- 4 parts, 1.2m total length
- easy disassembly
- conic fitting surfaces

- small prototypes produced (200mm)
- different fibers
- different glues

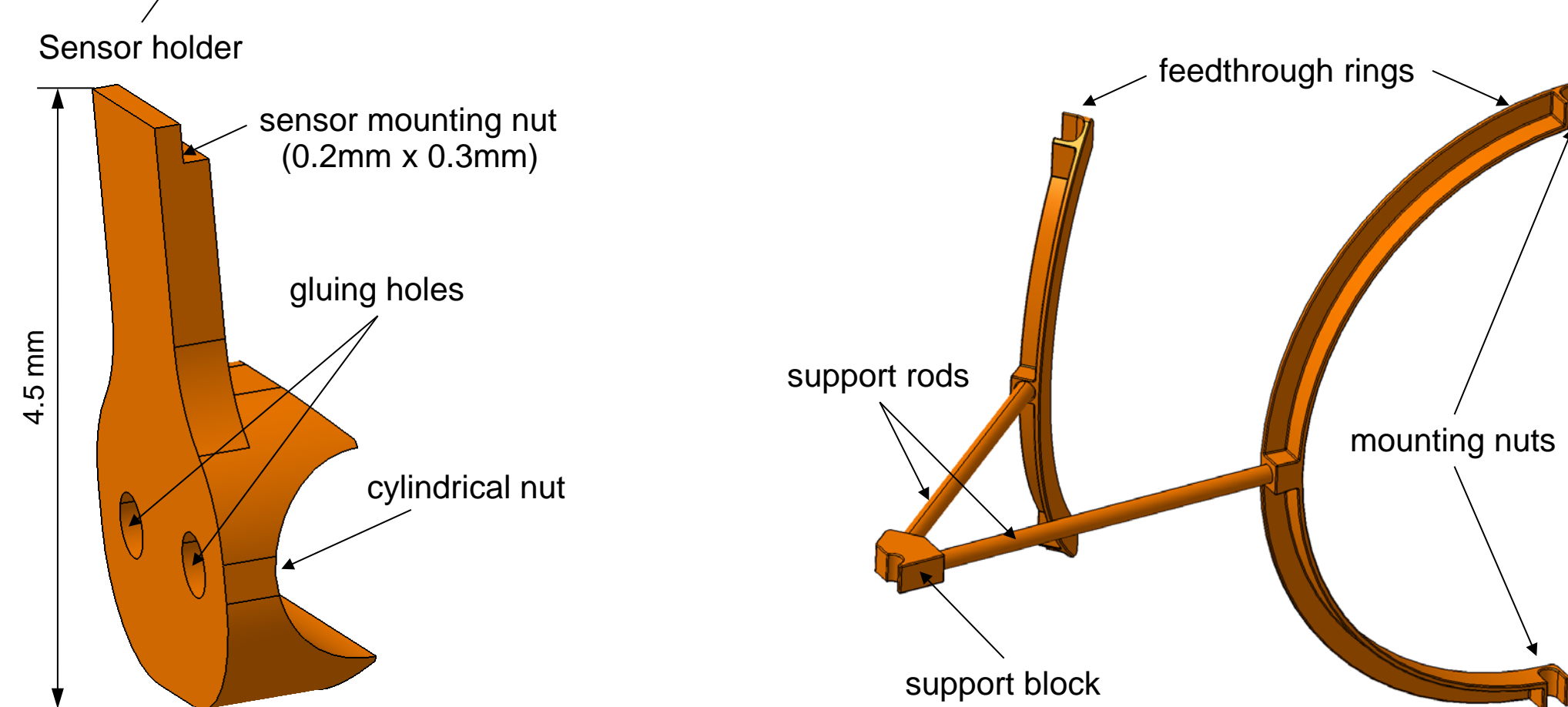
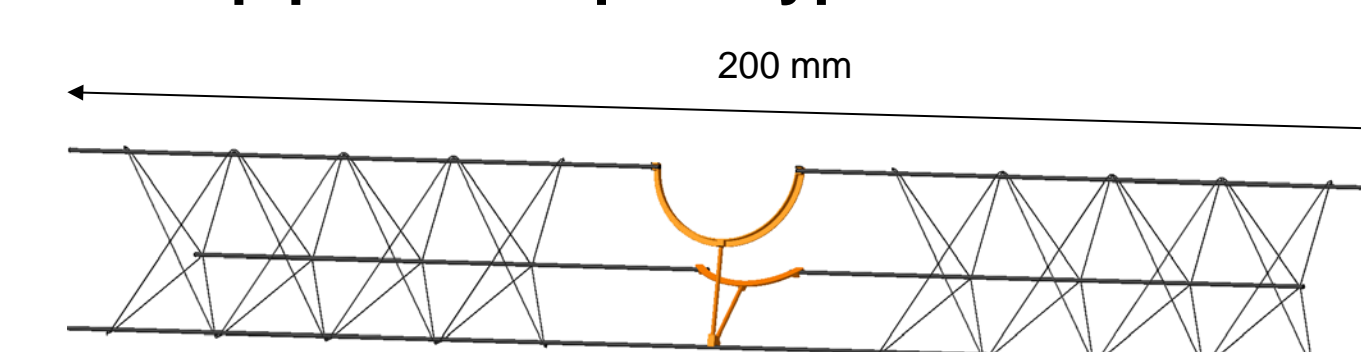
Prototype carbon ladder



- 106 carbon ladders
- 16 ladder types
- positioning with ruby balls
- floating bearing arrangement
- length ~500mm - ~1000mm

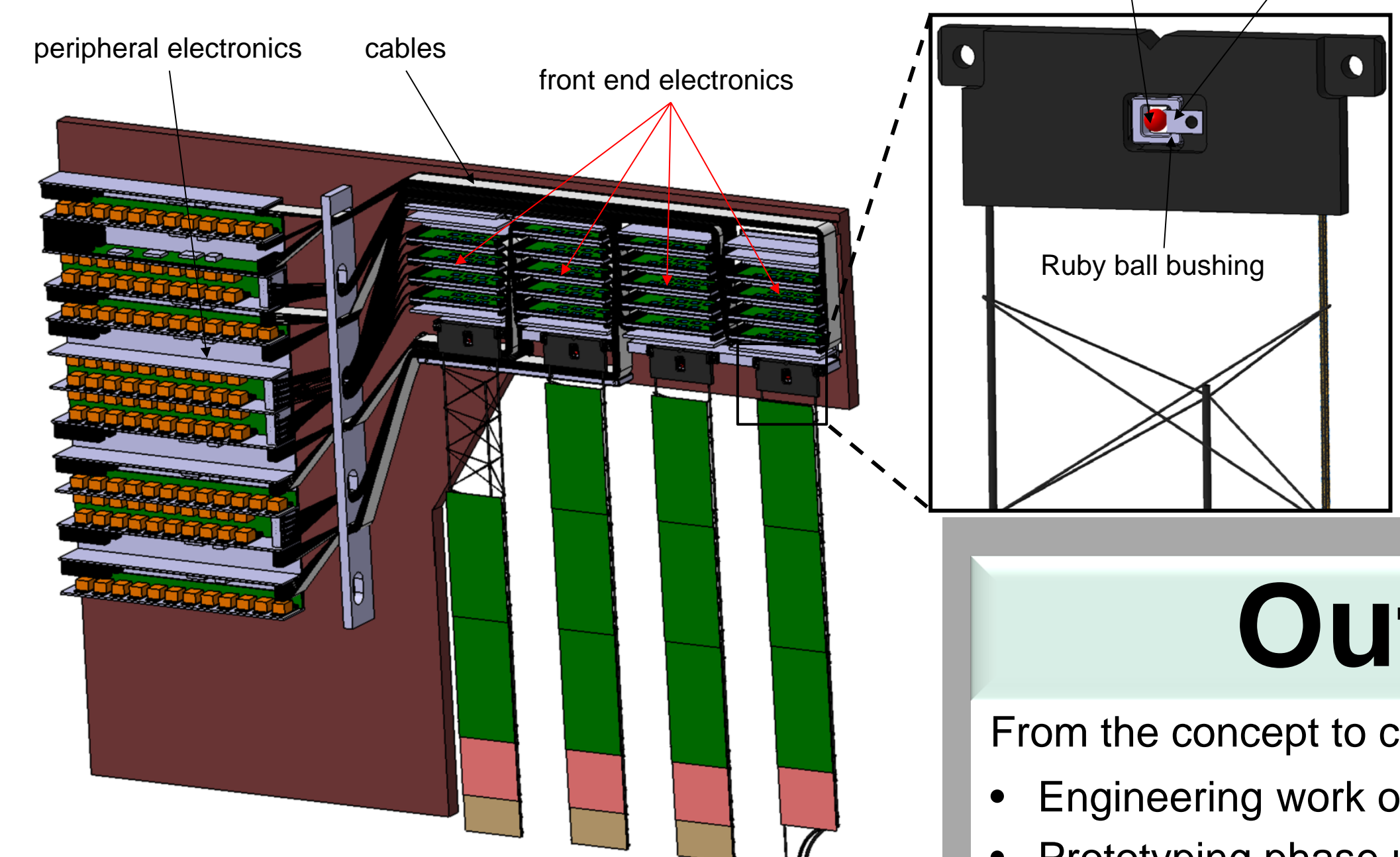


Beampipe cutout prototype



- thin carbon structure
- two cutout types
- independent production
- support parts for increased stability

C-Frame section view



Ruby ball bearing:

- no thermal stress on a ladder
- precise repositioning
- floating bearing possible
- springs compensate deformations

Outlook

From the concept to construction:

- Engineering work ongoing to full system design
- Prototyping phase until 2016
- Production of components: 2016-2018
- Design and production of CO2 cooling