JUSTUS-LIEBIG-UNIVERSITÄT GIESSEN

Status of the technical design for the PANDA Disc DIRC

Erik Etzelmüller, Klim Biguenko, Michael Düren, Klaus Föhl, Avetik Hayrapetyan, Benno Kröck, Oliver Merle, Julian Rieke, Thomas Wasem

PID DIRC

PANDA XLVIII. Collaboration Meeting

11 March 2014

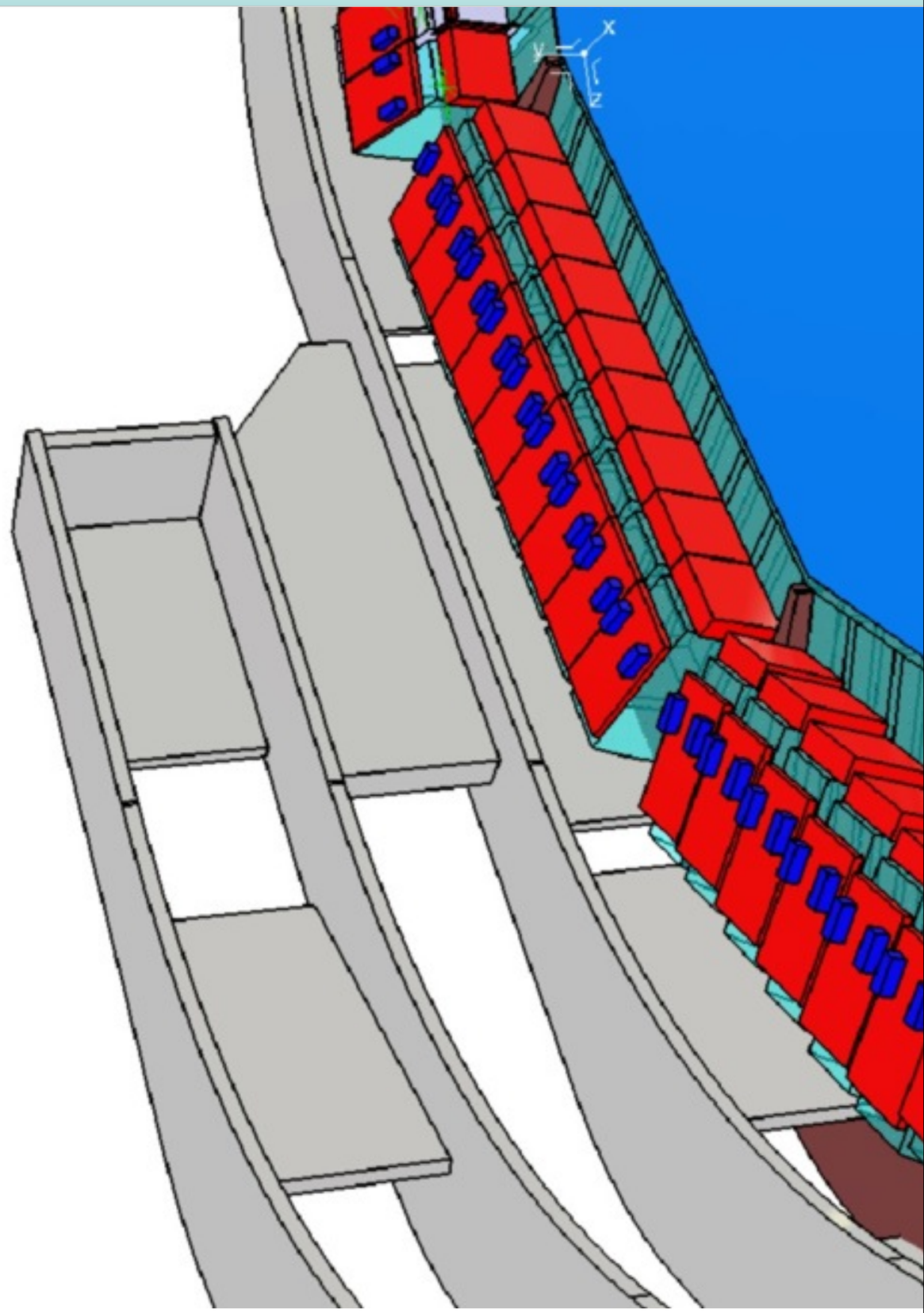
Goals and requirements

The Disc DIRC is a large optical device with many components that have to be precisely aligned and joined

(1 radiator, 81 FLGs and 81 prisms per quarter)

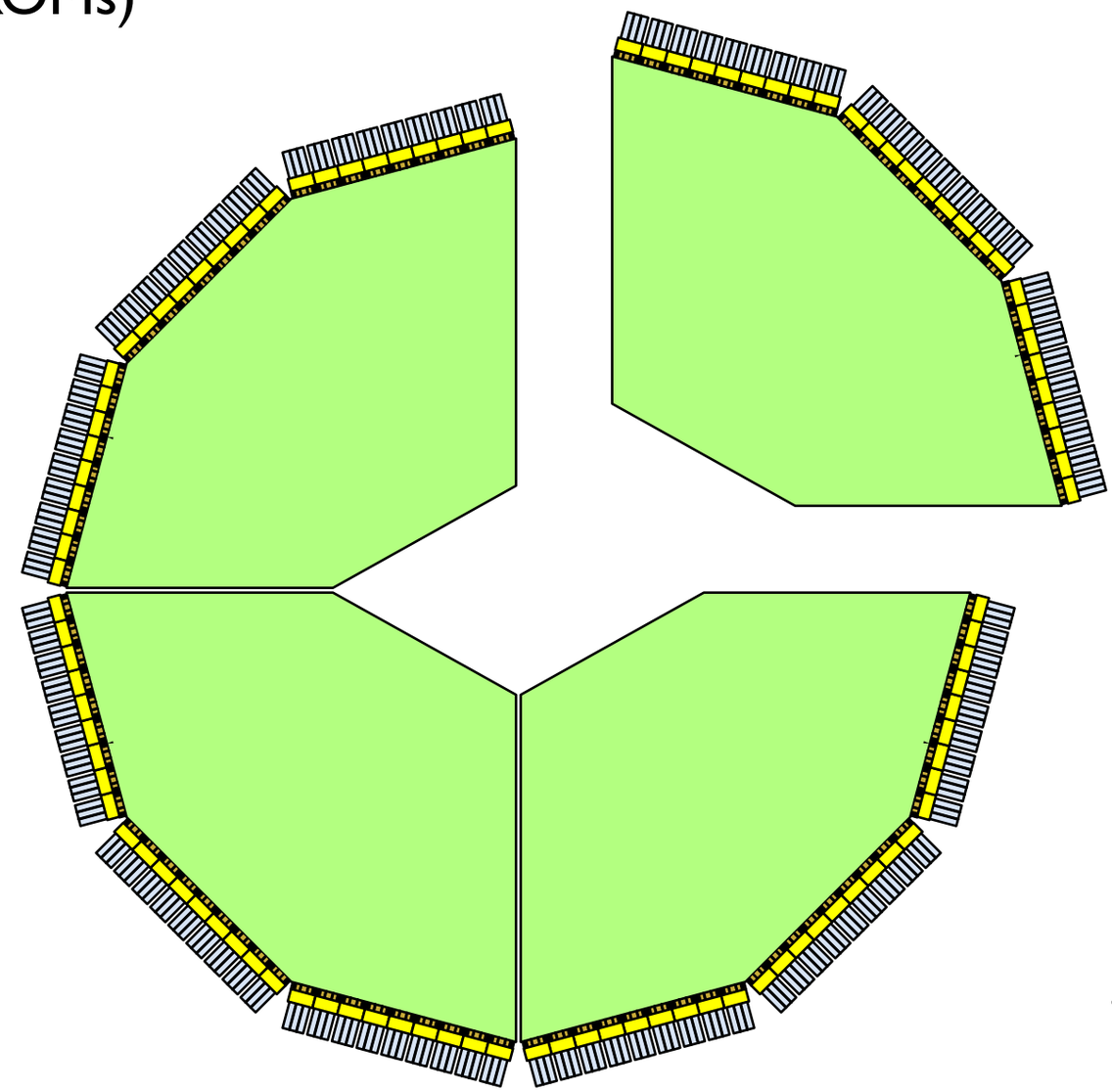
A goal is to minimize contact between optics and mechanics to prevent from damage due to thermal expansion

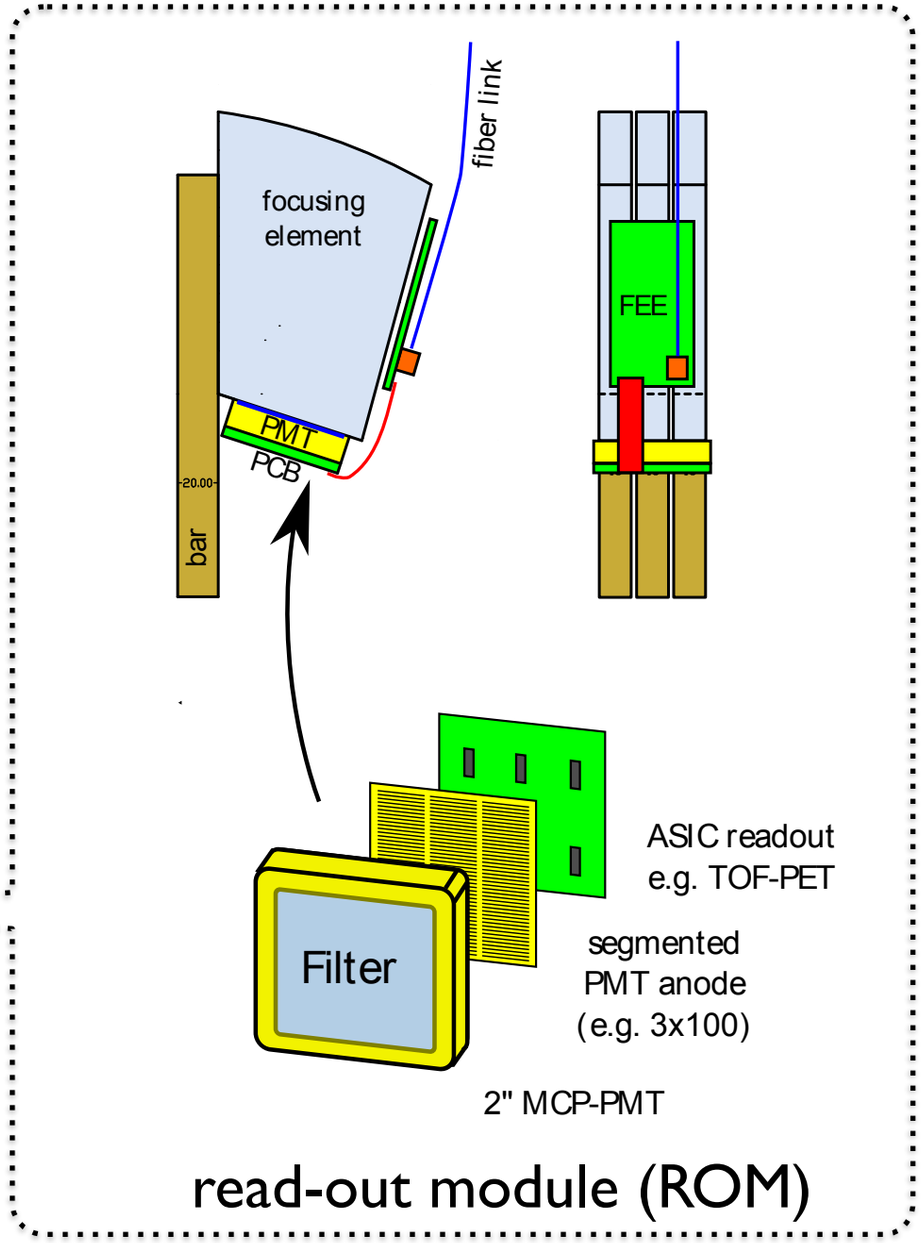
This has to be achieved in a hostile and spatially very tight environment



The Disc DIRC's heart

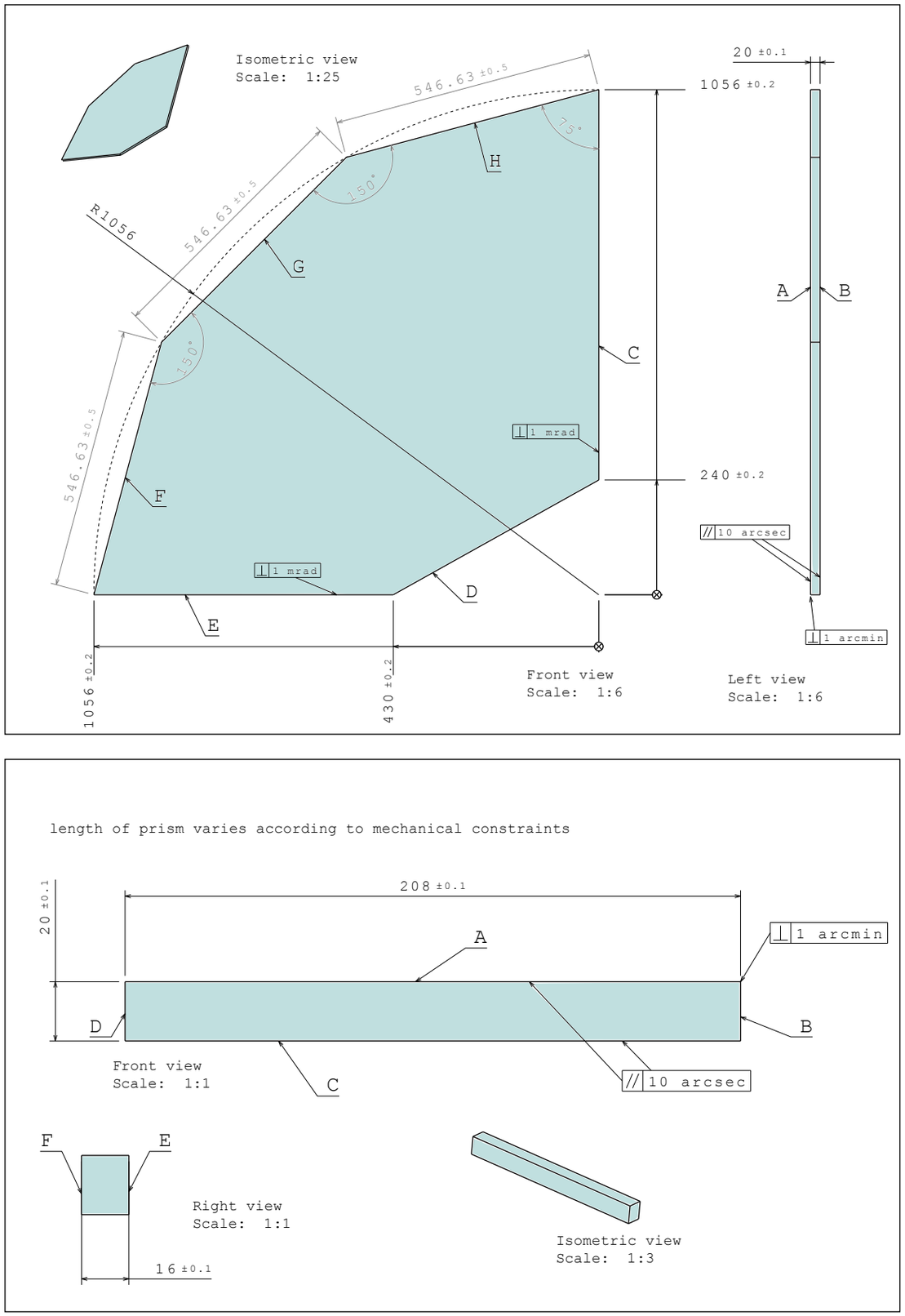
four independent quadrants made of fused silica and equipped with a total of **81 read-out modules** (ROMs)



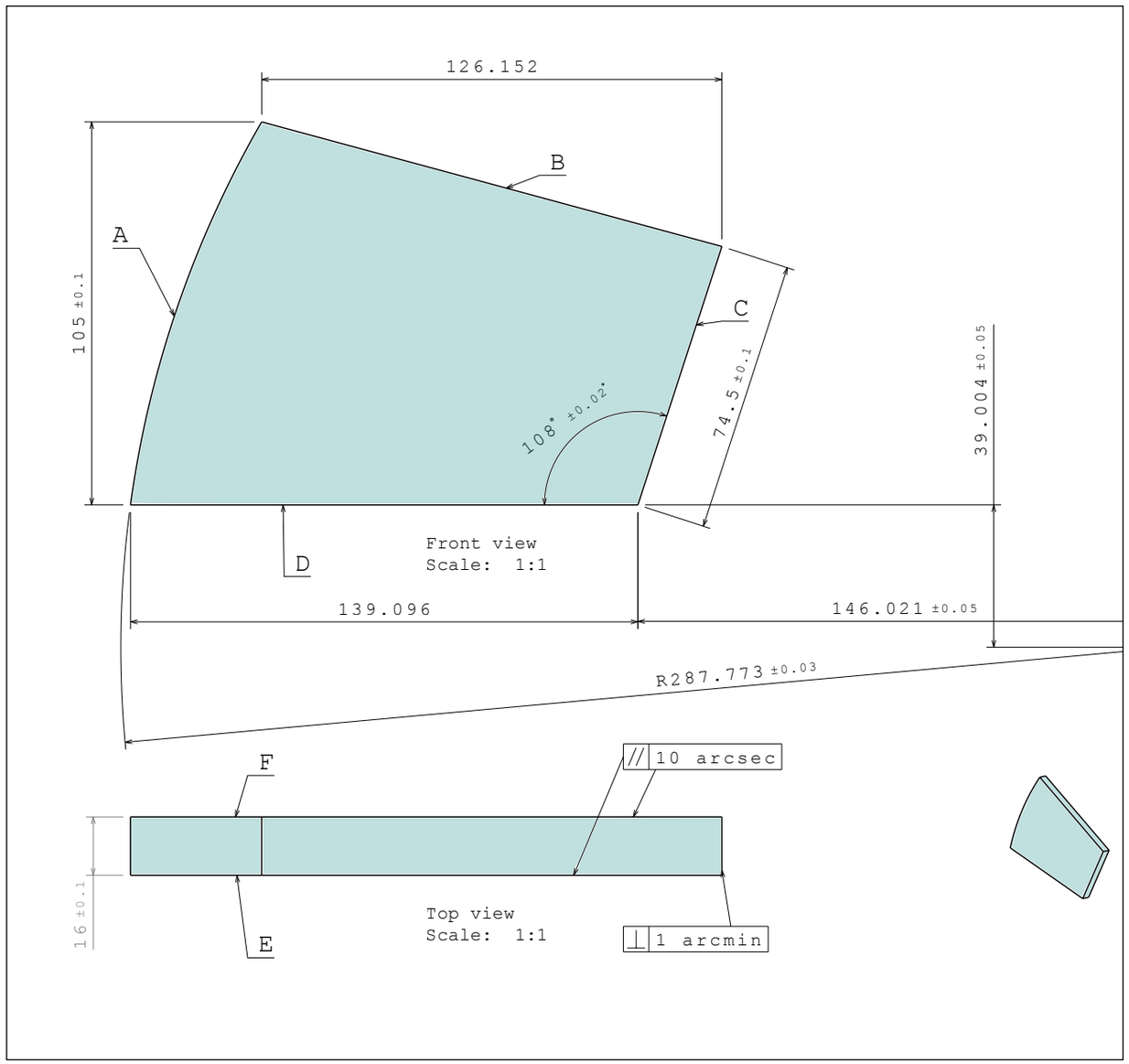


each **ROM** hosts three **prisms** and focusing light guides (**FLGs**) as well as a photo-sensor (**MCP-PMT**) and the front-end electronics (**FEE**)

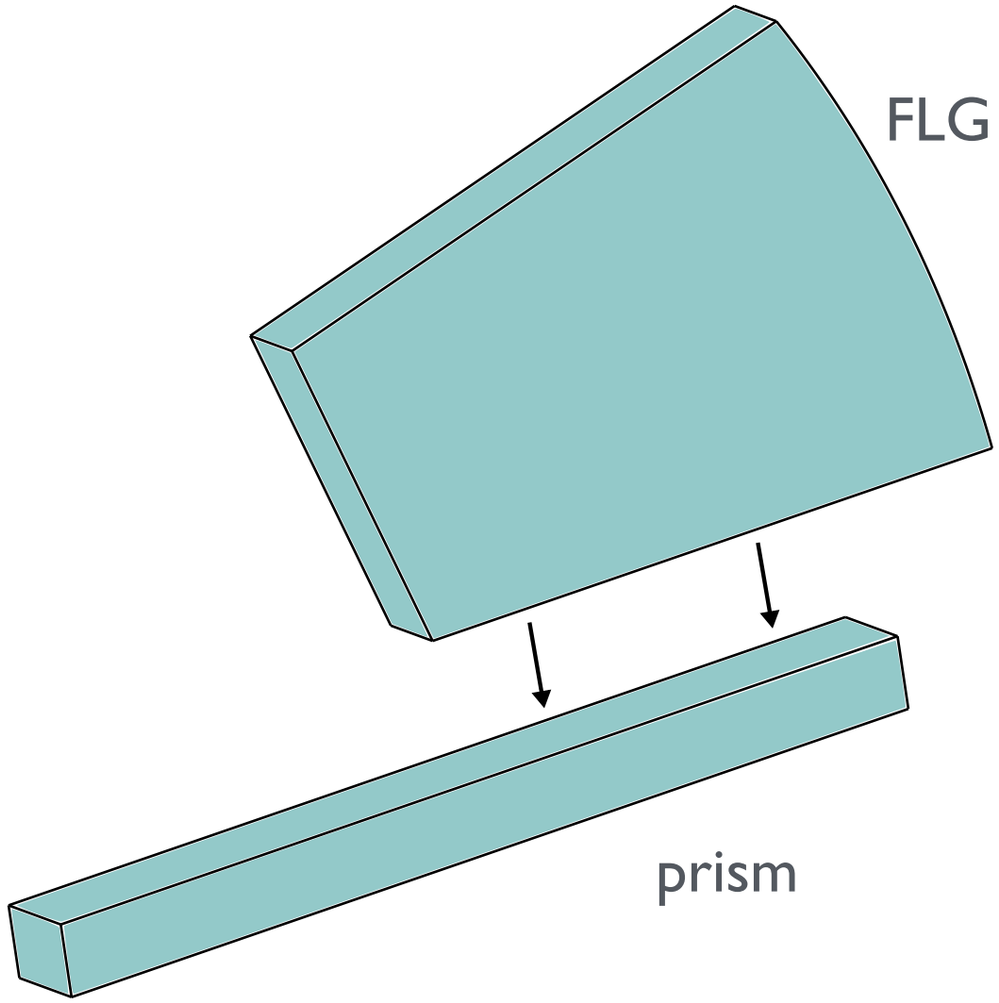
DIRC components



Optical components have been specified and prototypes are close to being ordered

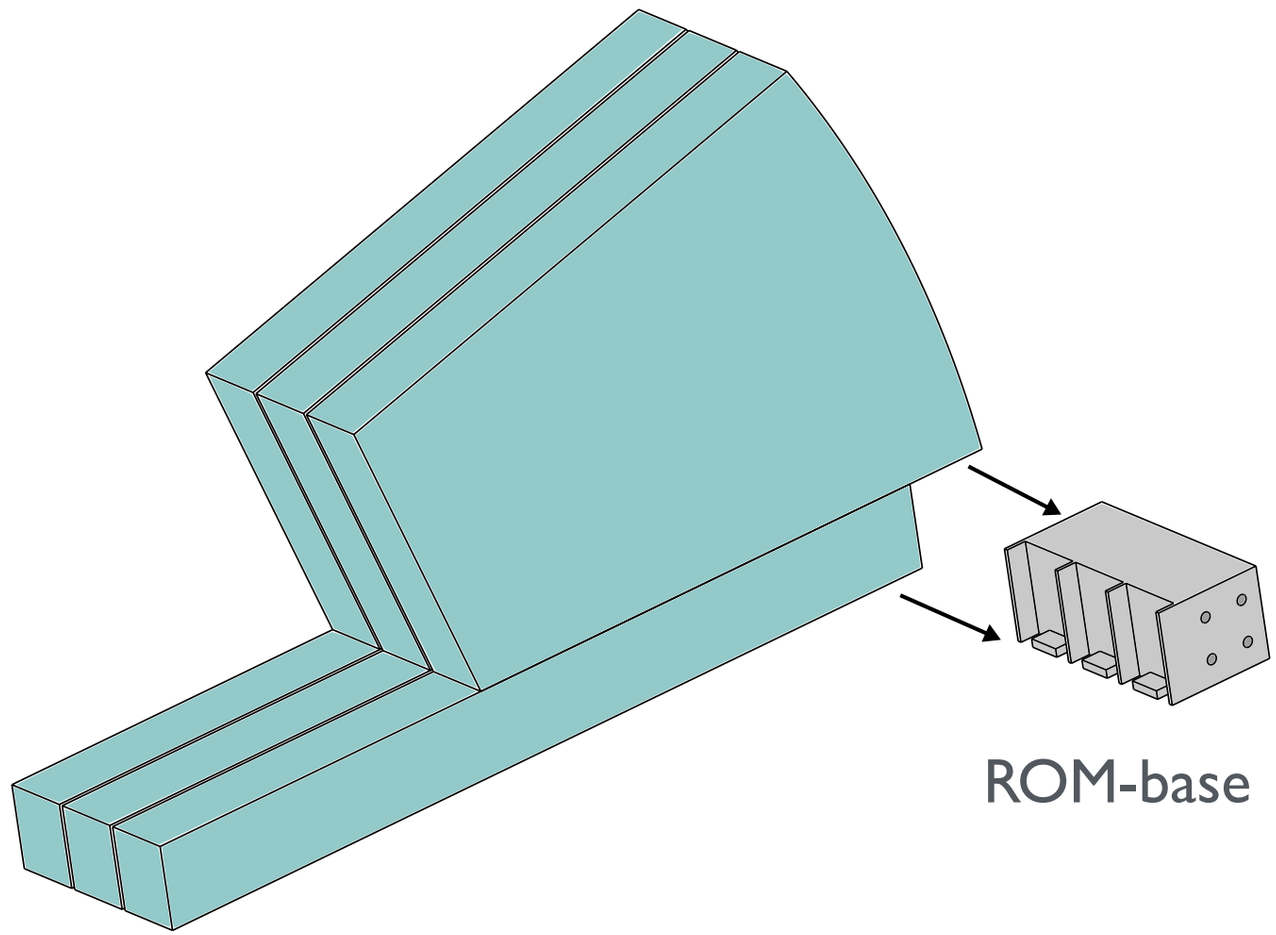


ROM assembly



join **FLG** and **prism** if not bonded

glue 3 **FLG/prism** components
to **base** (e.g. made of duroplast)



ROM assembly

ROM-case

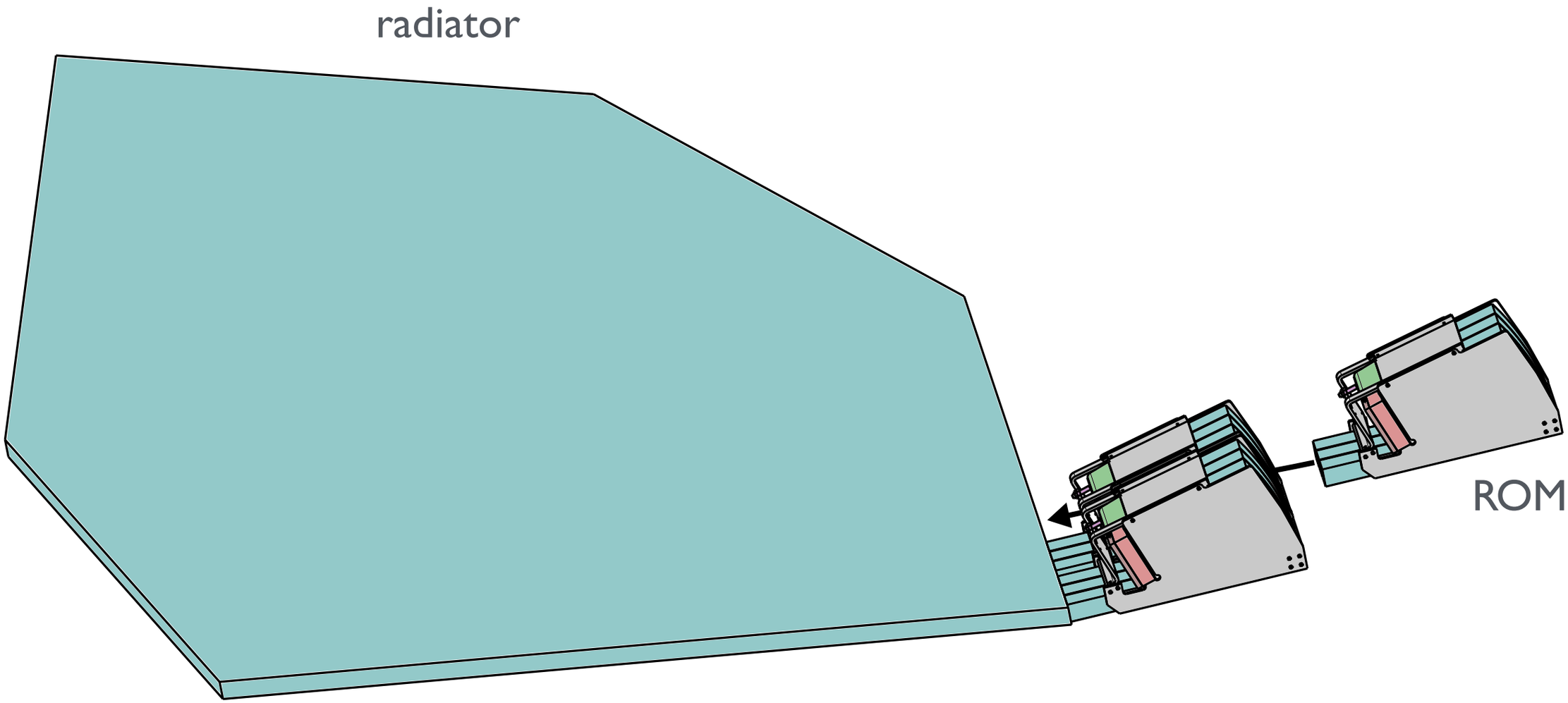
move **case** over and connect it with **base**

PMT+PCB

spring-loaded sensor-mount

attach **PMT+PCB** to spring-loaded **sensor-mount** and add it to the **case** to complete the **ROM**

ROM assembly

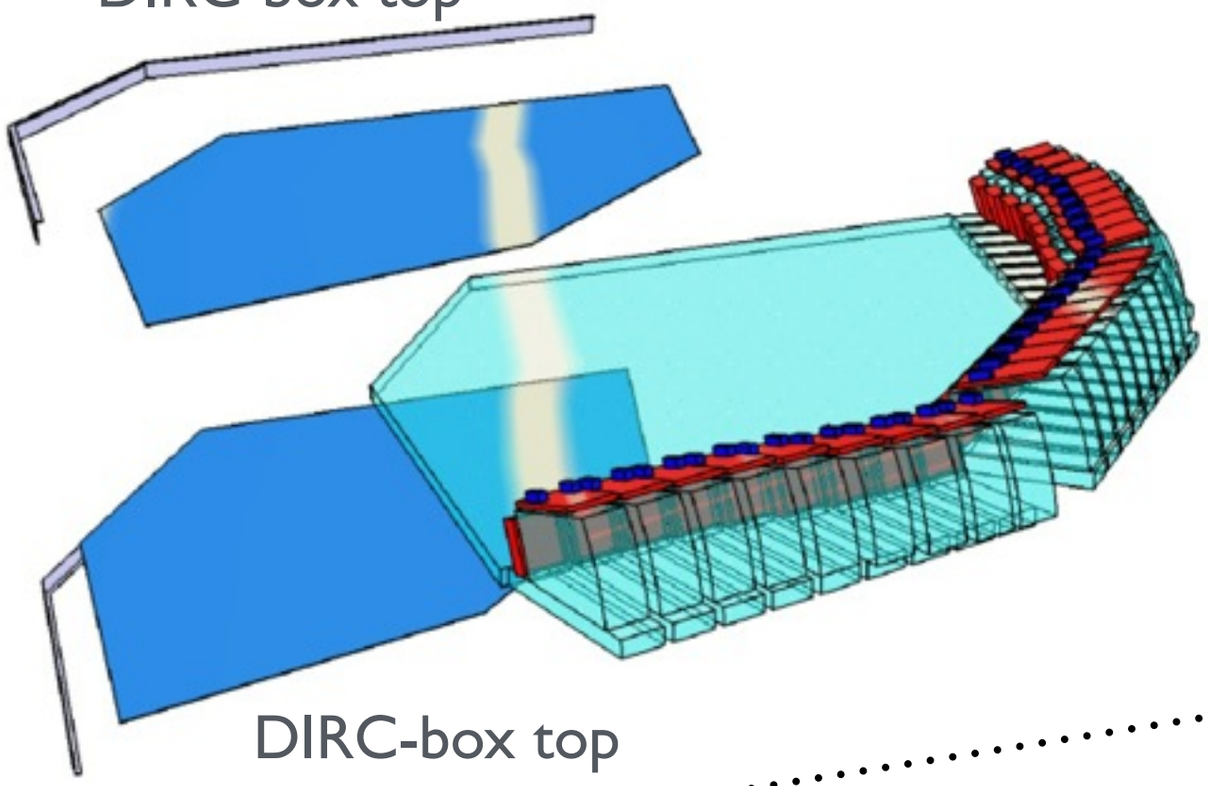


glue **ROMs** piece by piece to **radiator**

PMT+PCB can/should be removed and reattached after this procedure

DIRC assembly

DIRC-box top

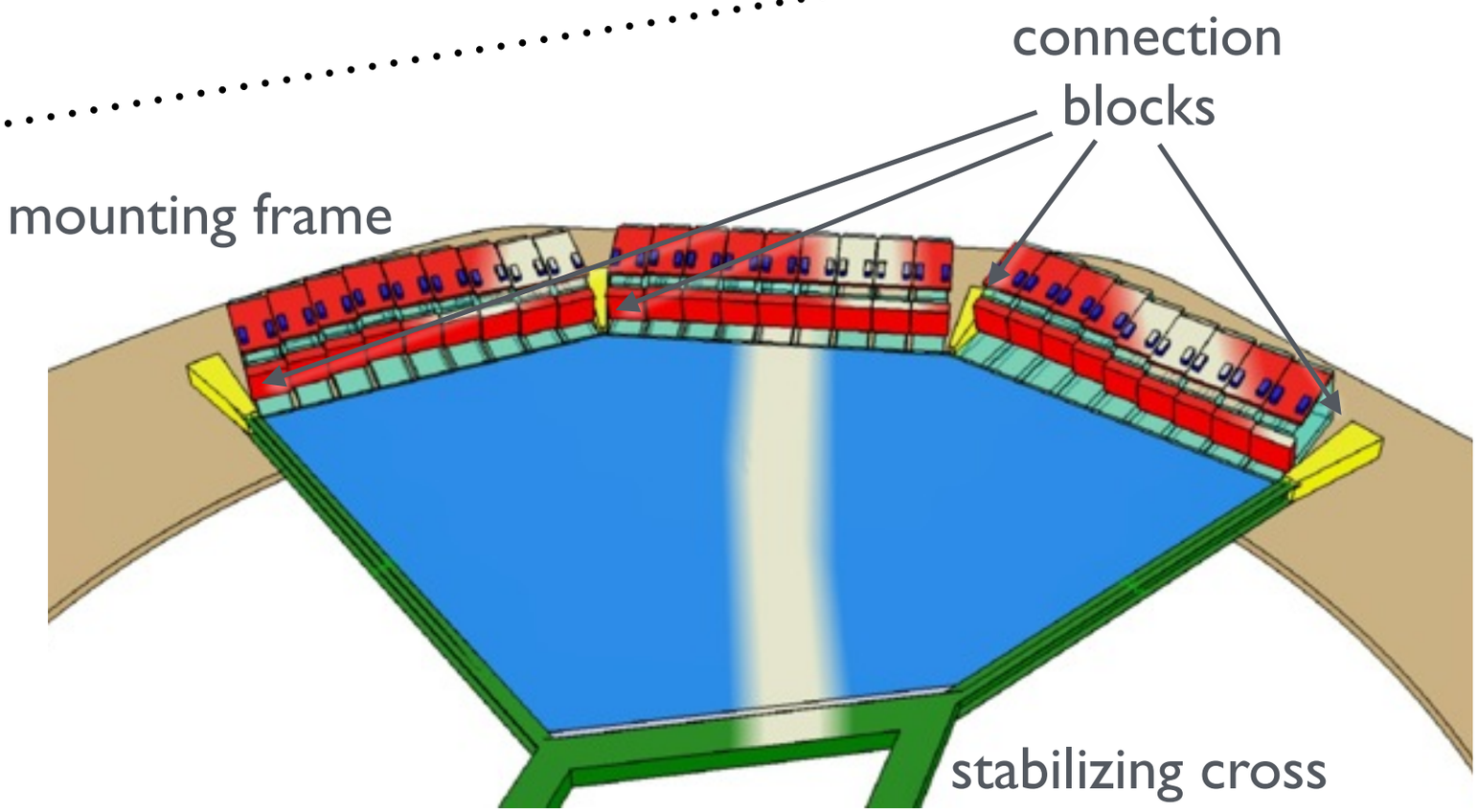


DIRC-box top

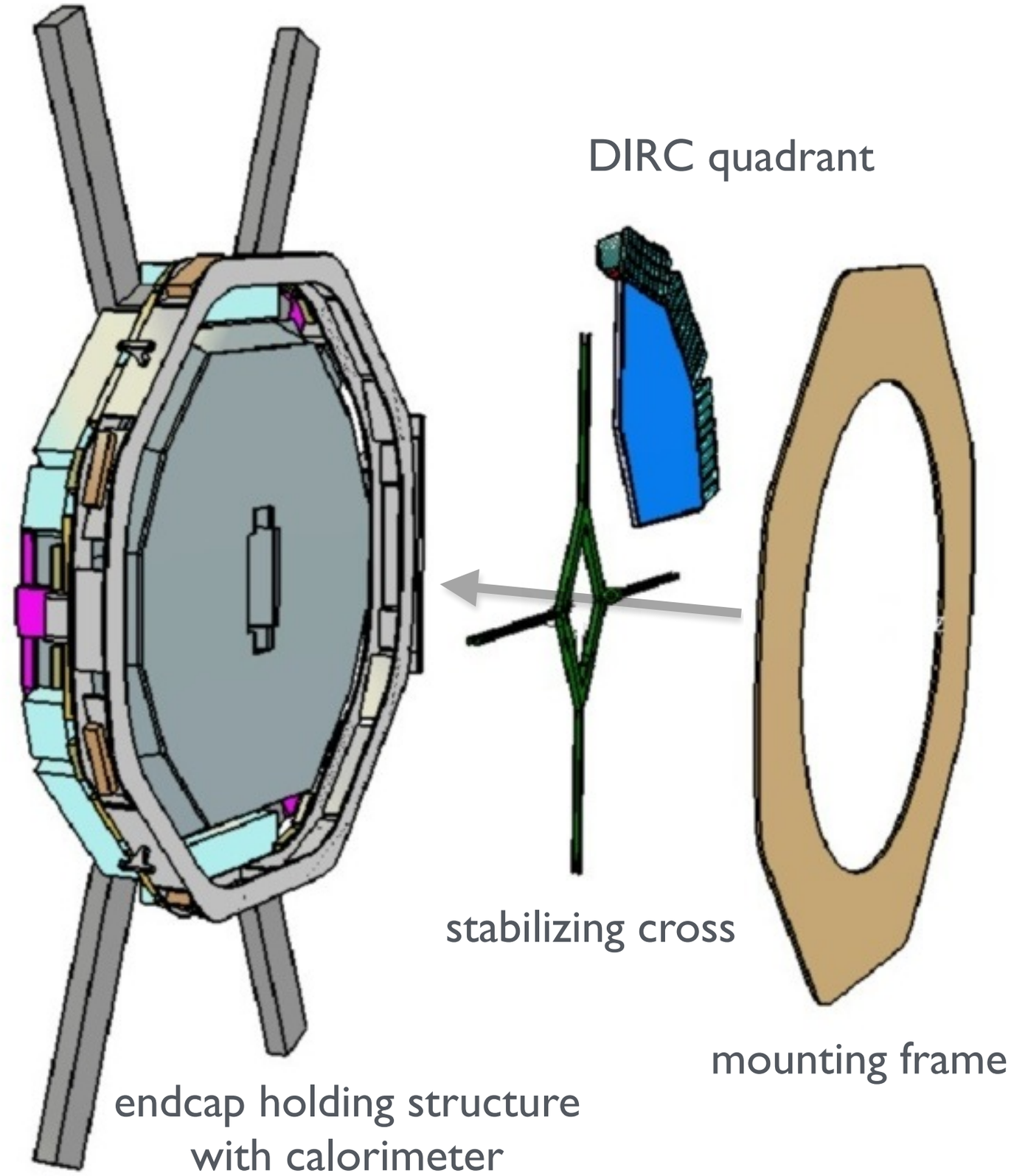
encase fully equipped **DIRC quadrant** with a gas- and light-tight **box**

slide **DIRC-box** into **stabilizing cross**

move spring-loaded **connection blocks** up to the **radiator**



DIRC assembly

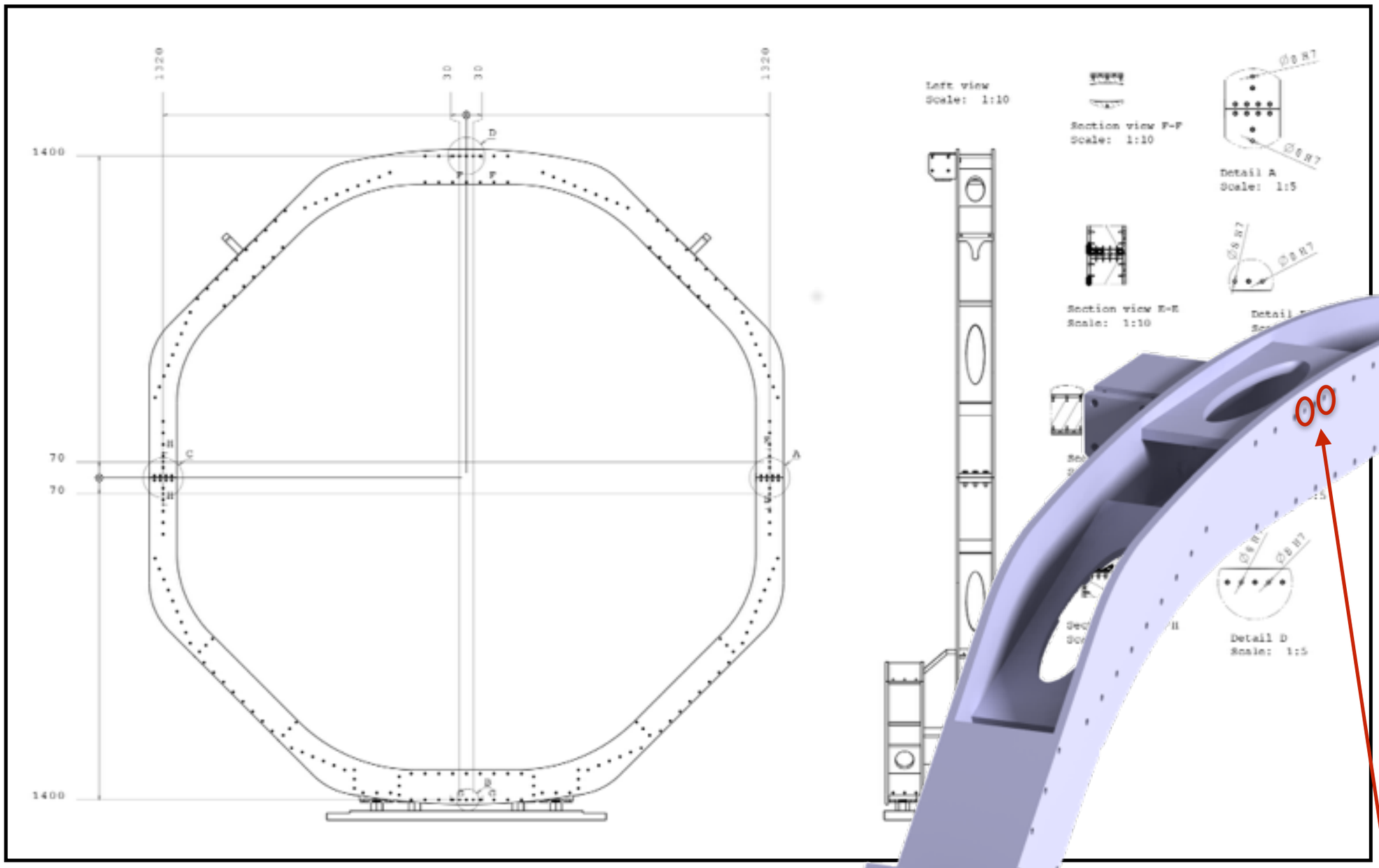


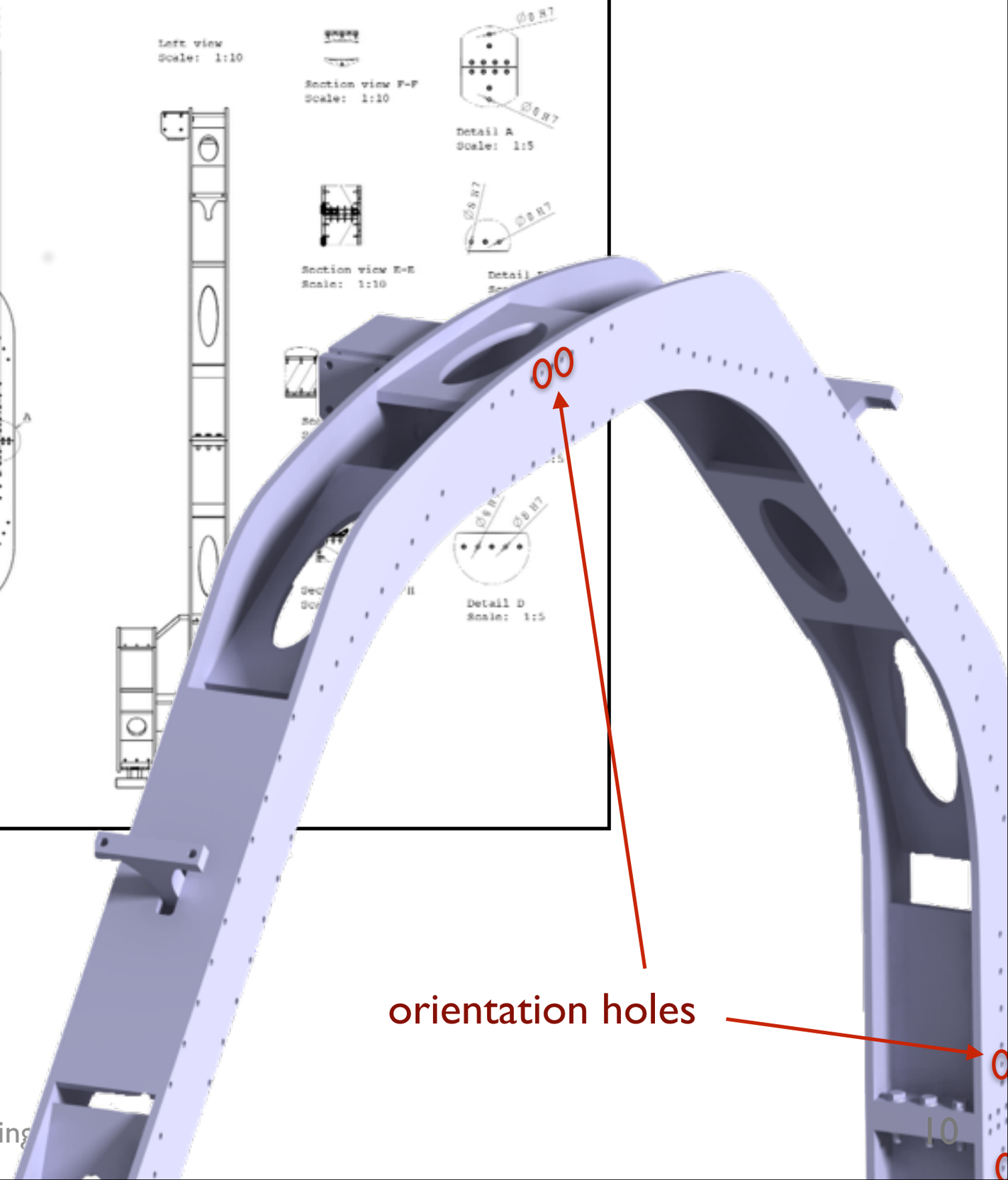
assembly of **DIRC quadrants** with **stabilizing cross** and **mounting frame** in horizontal position

bring fully assembled **DIRC** to a vertical position using a custom-built mounting device

slowly move **DIRC** up to the **endcap holding structure**

DIRC assembly





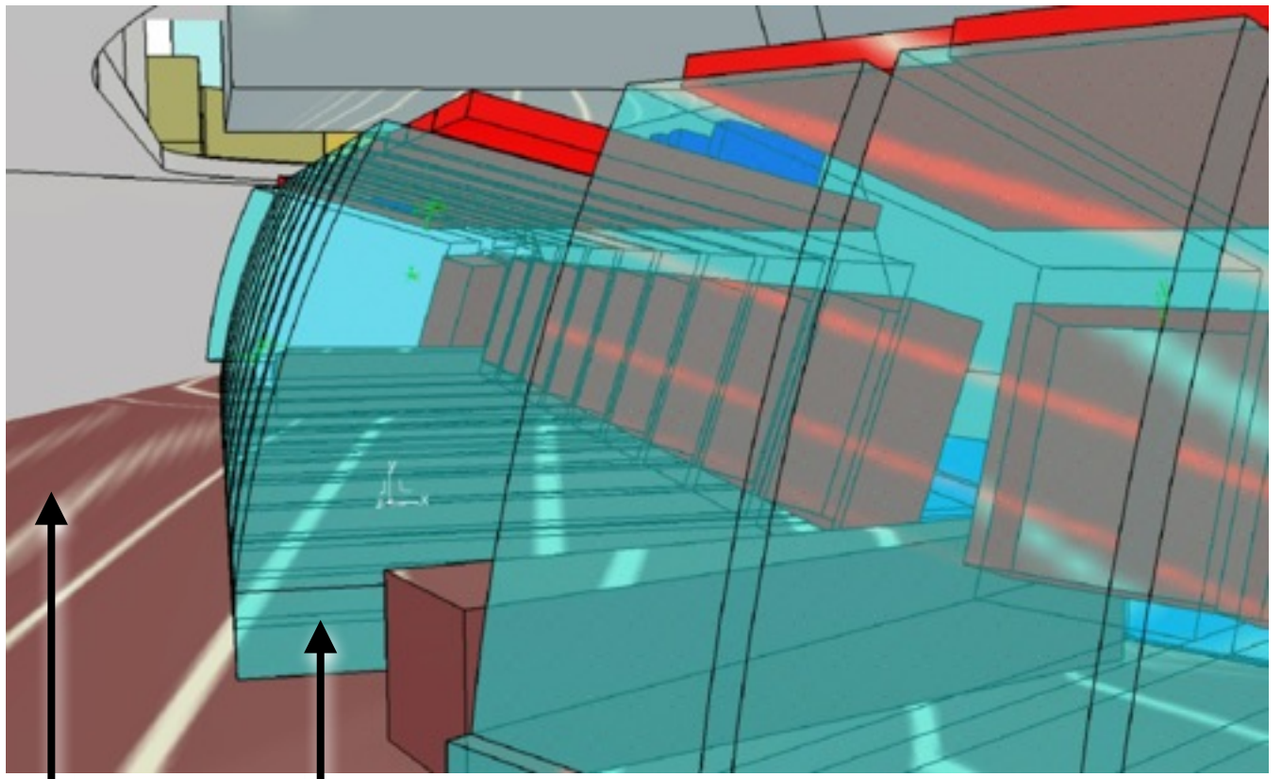
holding frame will be produced soon:

orientation holes

drilling stencils

DIRC assembly

tight spacial environment



bars between radiator and FLGs are essential due to asymmetric environment

lateral hollows in the endcap support frame can host additional electronics to minimize cabling

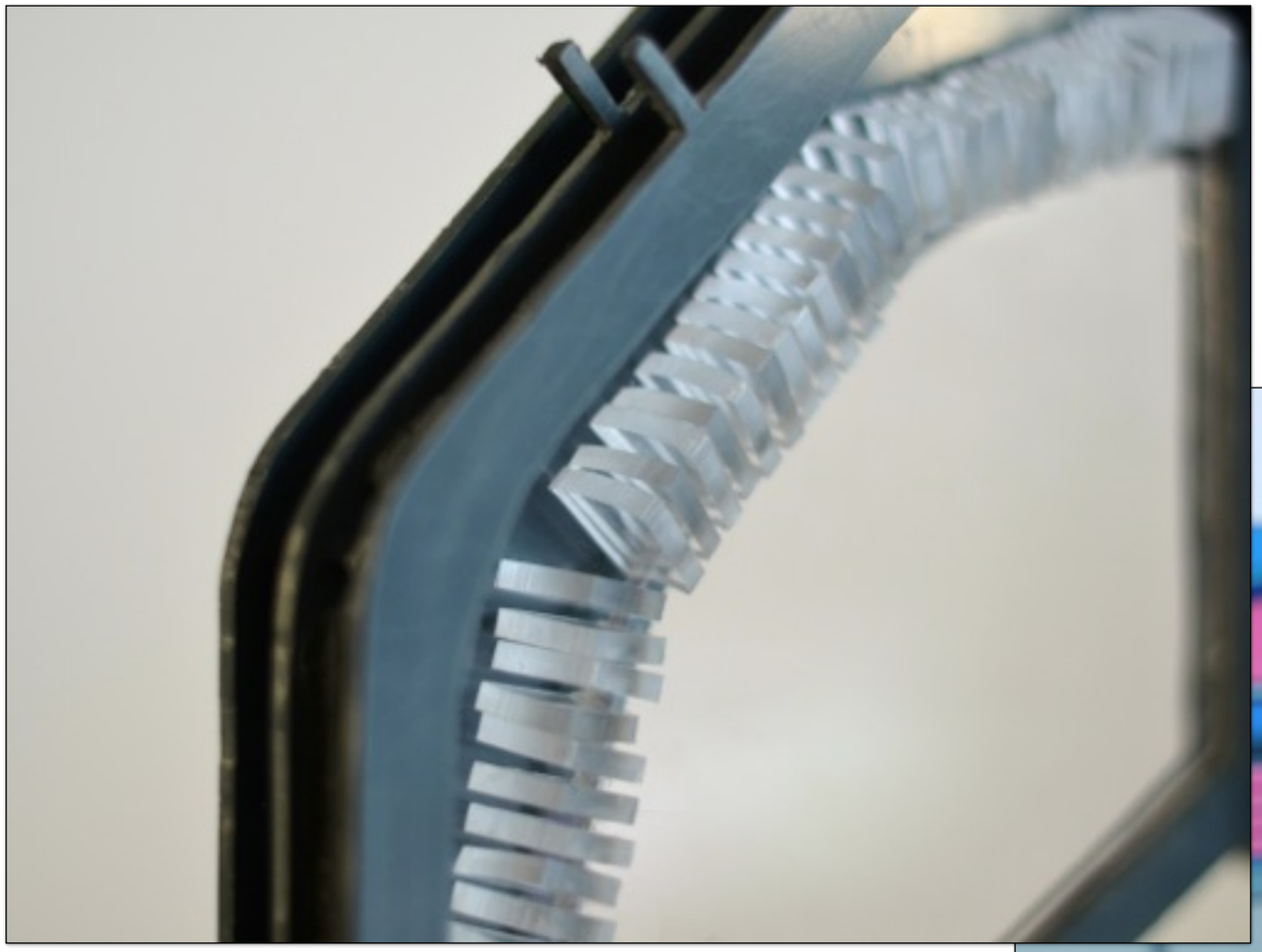
further details

nylon stripes will keep radiator and box at distance and allow a guidance for the gas flow

ROMs will be encased as well, which requires various complex boxes

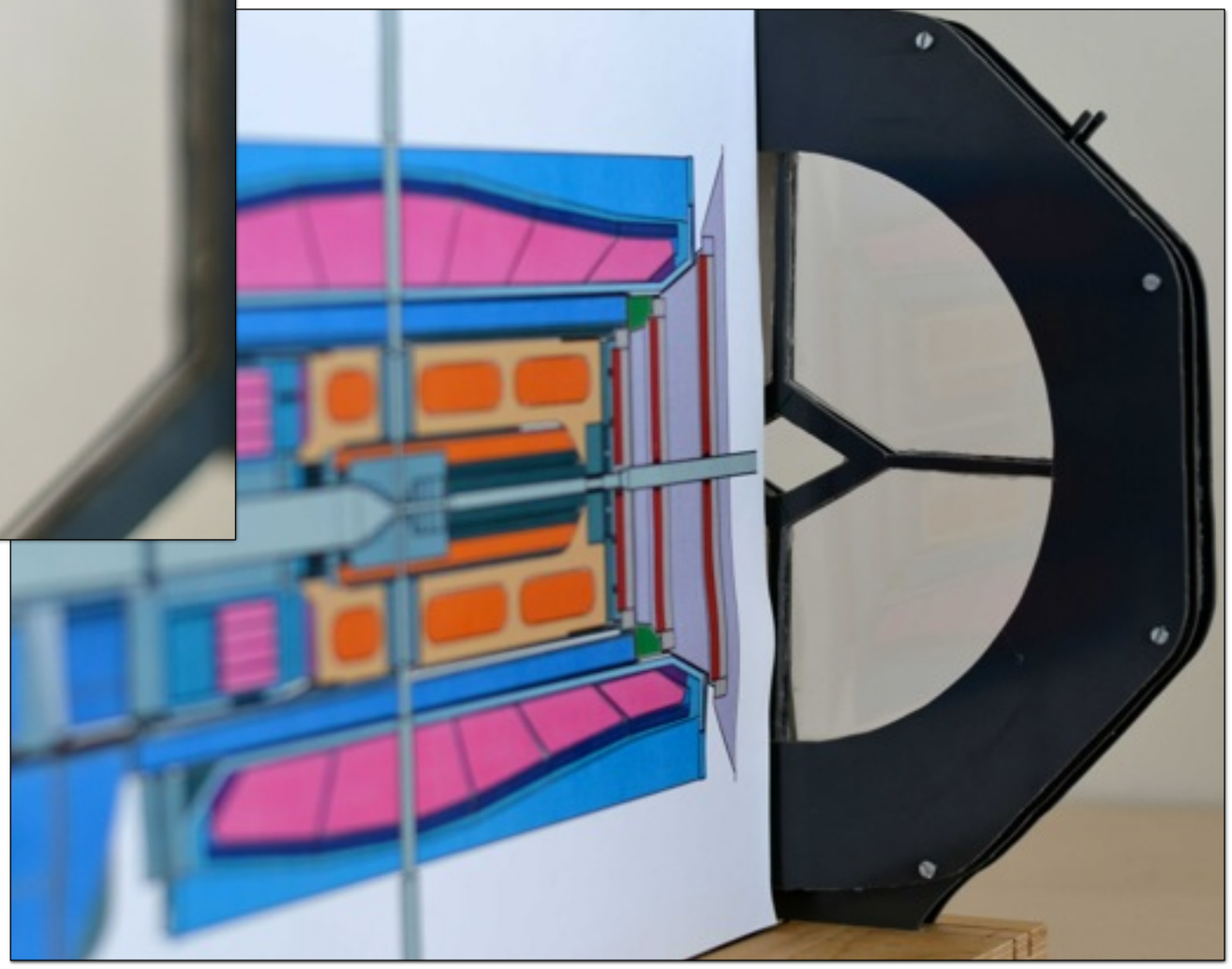
space reserved for water-cooling of electronics if necessary

First miniature DISC Dirc



Scale 1:10

made out of plastic



build by our school trainee Jan

mechanical prototype for a Disc DIRC quarter in preparation

Scale 1:1

one quarter

made out of wood

testing of mechanical components, assembly, cable routing, slow-control, …