Mirror Positioning Control System

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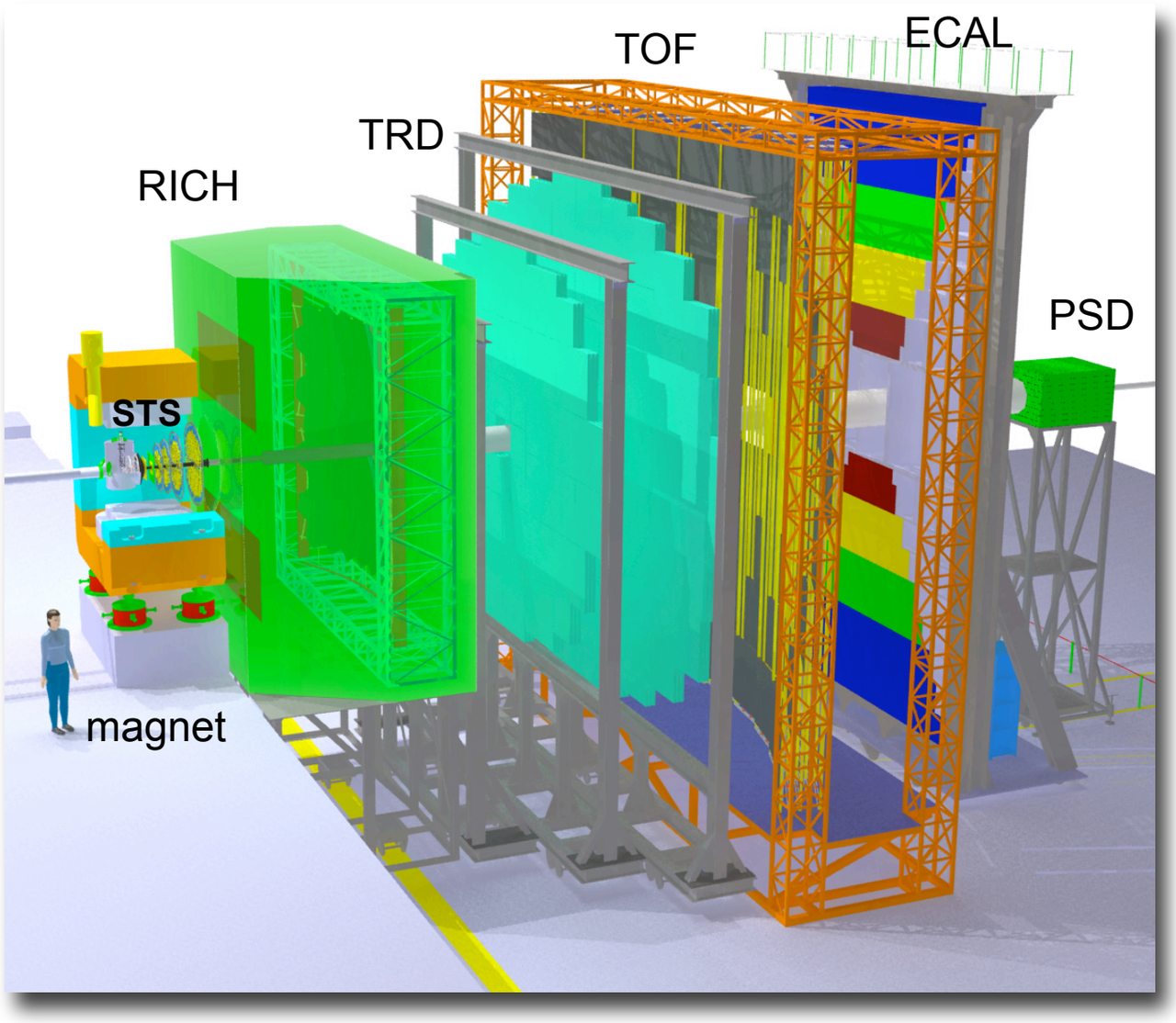
Summer School Project

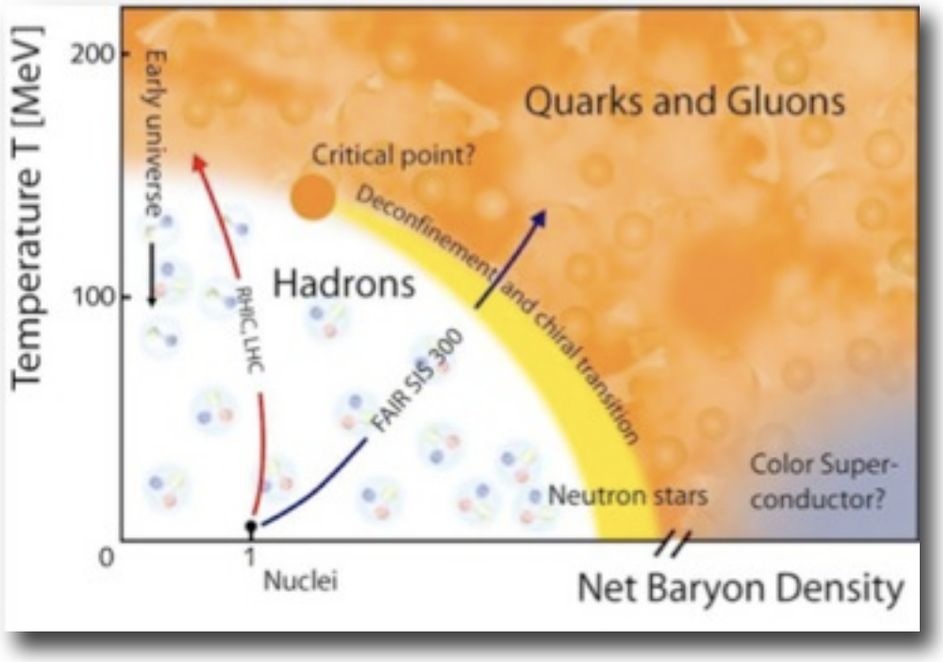
HGS-HIRe for FAIR
Helmholtz Graduate School for Hadron and Ion Research

GSI Helmholtzzentrum für Schwerionenforschung

The CBM experiment

Compressed Baryonic Matter





Goal

✓ properties of Super-dense nuclear matter
✓ rare and penetrating probes(dileptons)

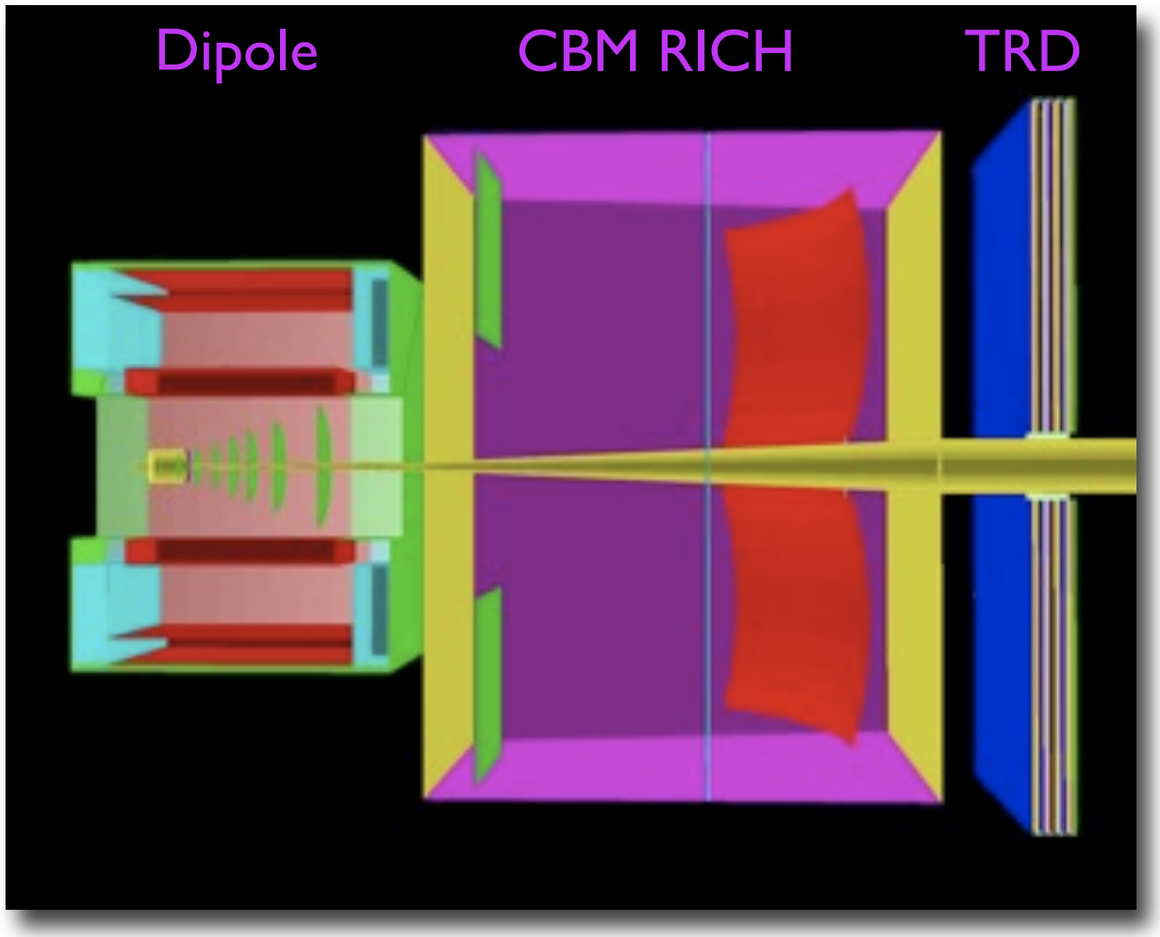
penetrating probes : $\rho,\omega,\varphi \rightarrow e^+e^-$
: $J/\Psi, \Psi' \rightarrow e^+e^-$

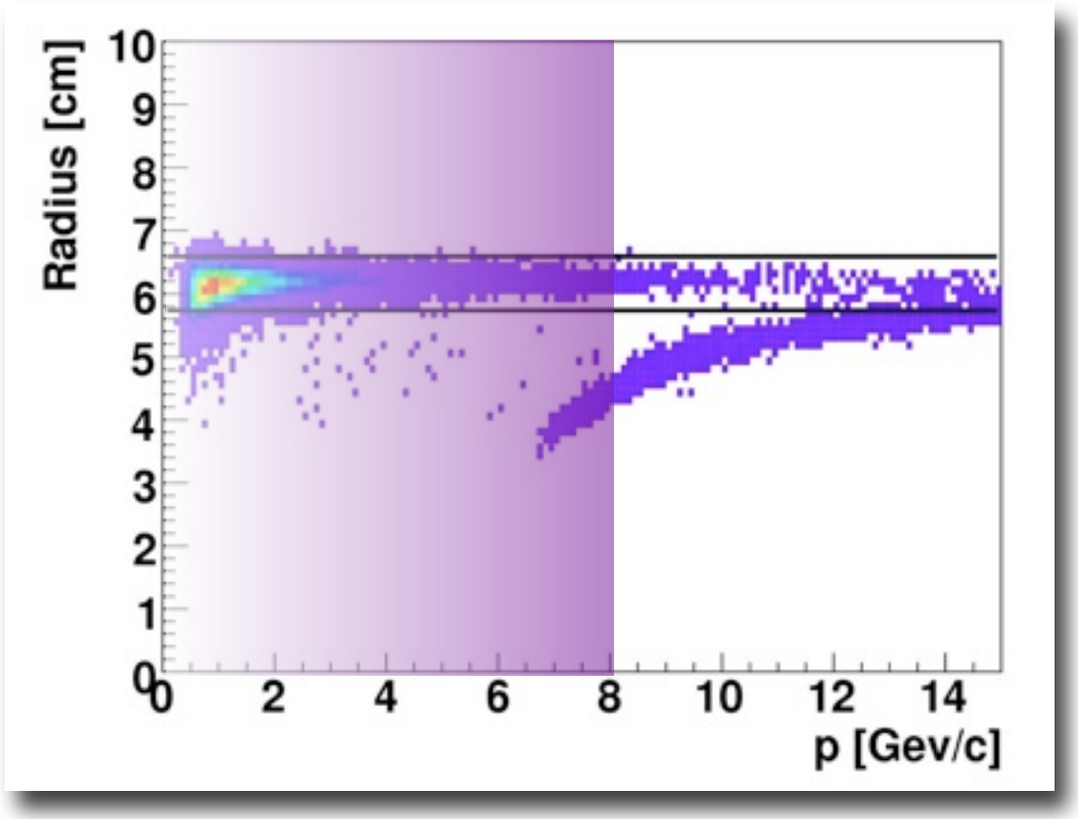
FAIR : Facility for Antiproton and Ion Research

- 10 to 40 GeV/u energy scanned

The CBM RICH detector

Ring Imaging CHerenkov detector

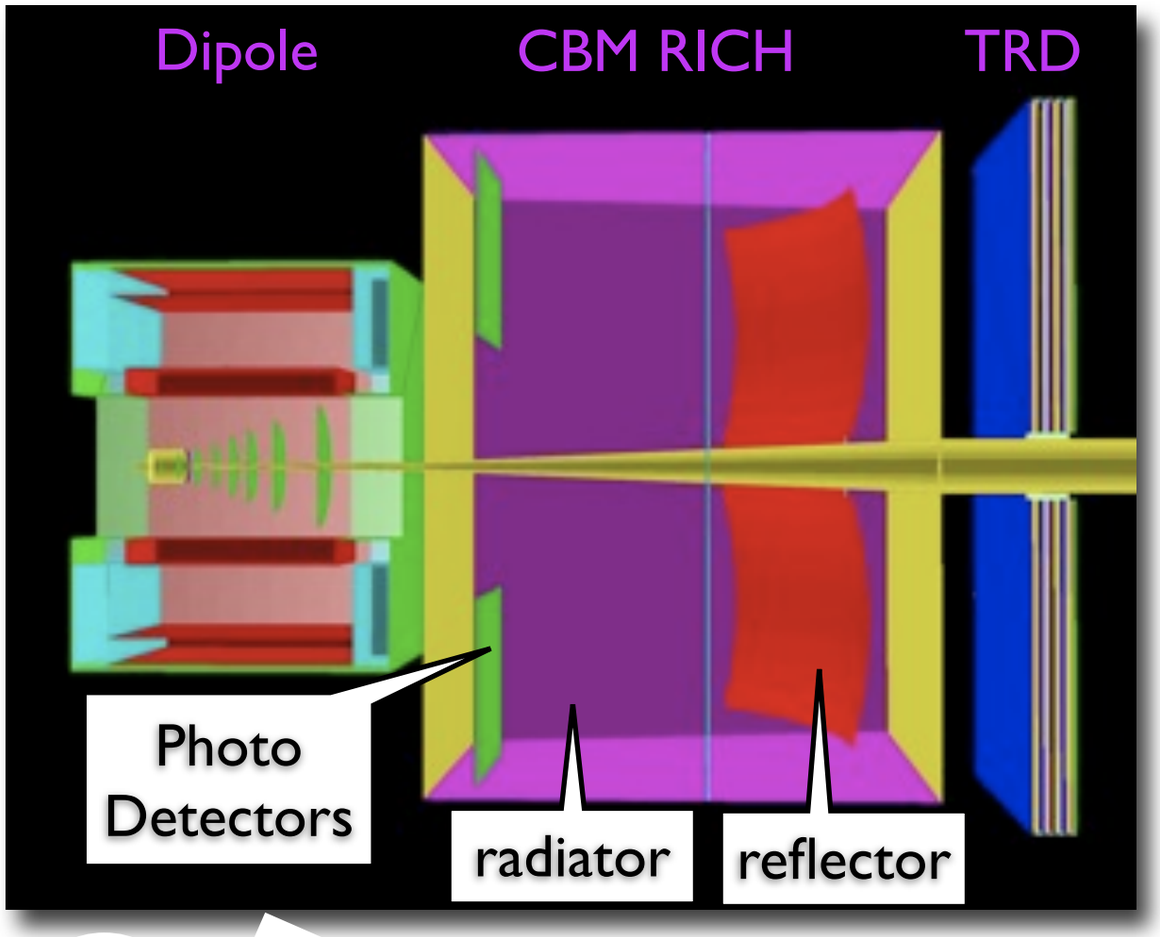


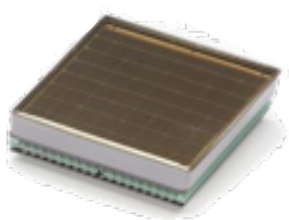


Aim : **Clean electron identification for momenta below 8GeV/c**

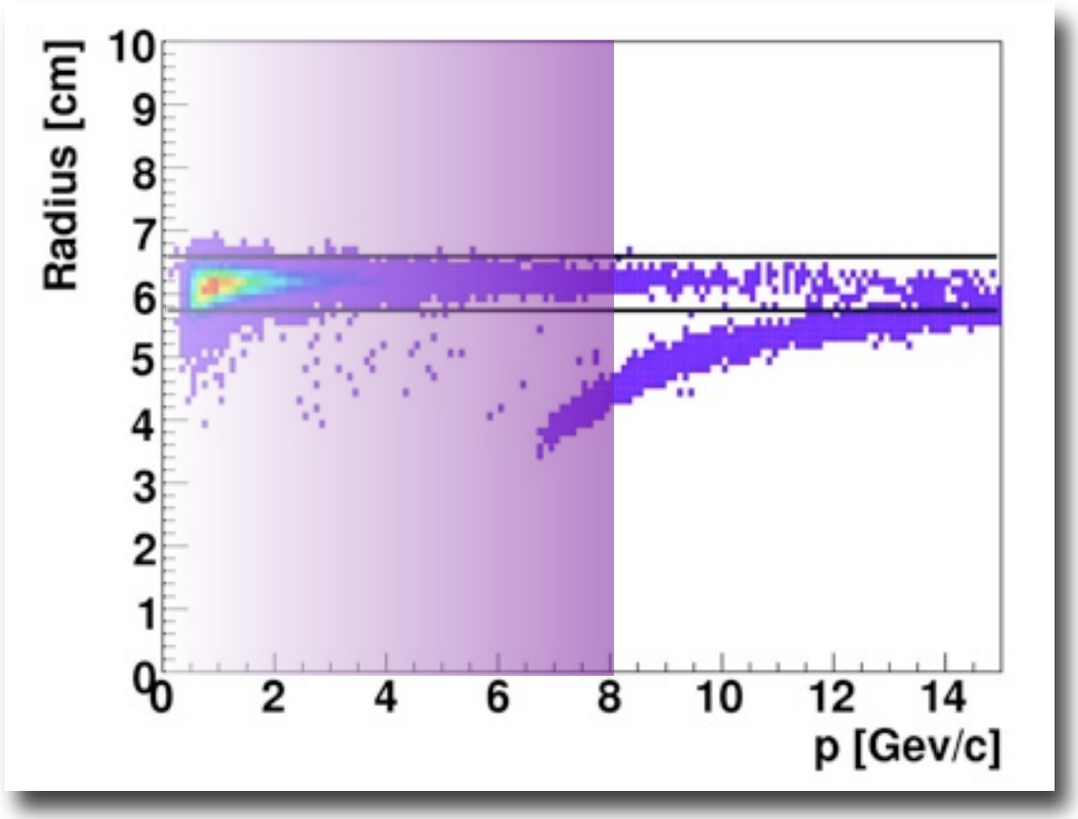
The CBM RICH detector

Ring Imaging CHerenkov detector





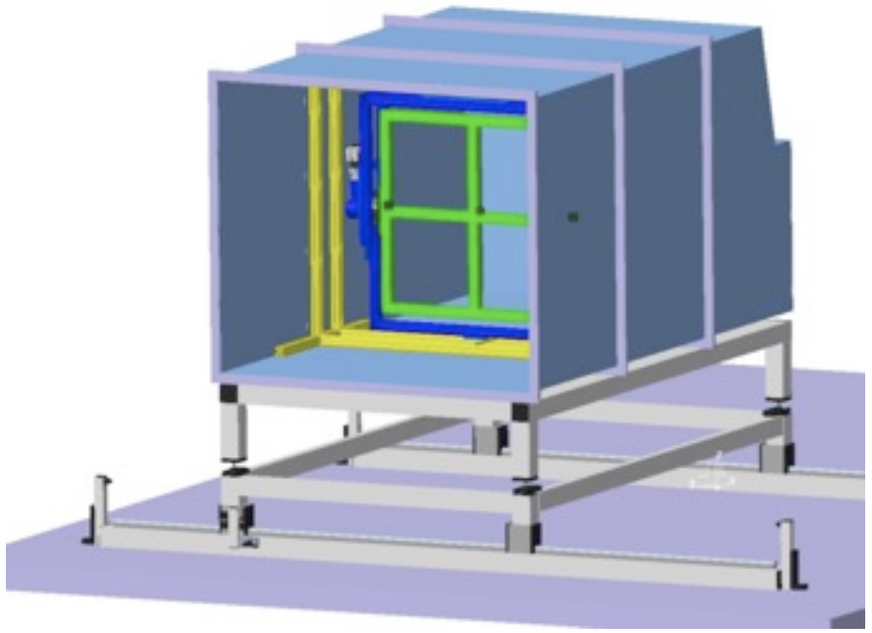
MAPMT : Multi-Anode Photo Multiplier Tube

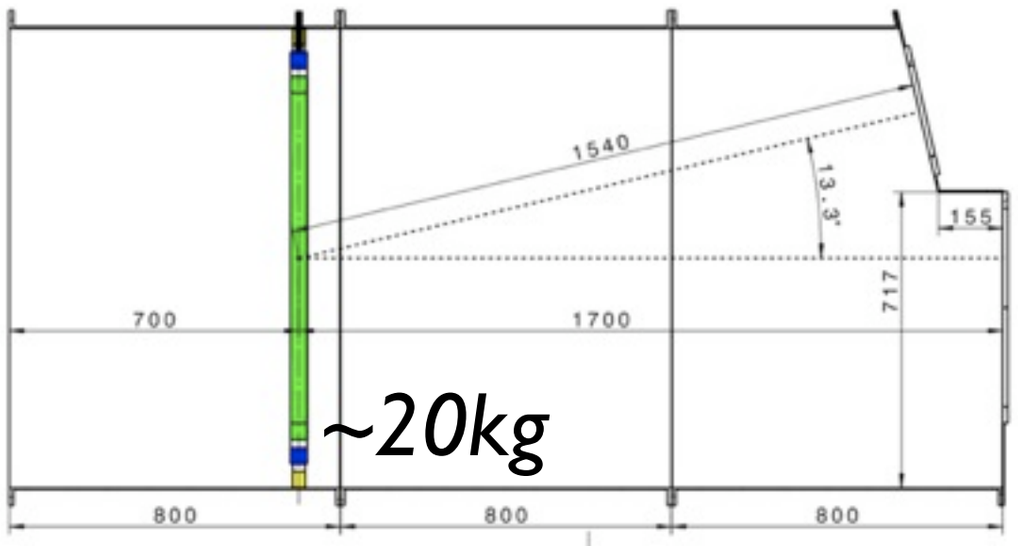


Aim : **Clean electron identification for momenta below 8GeV/c**

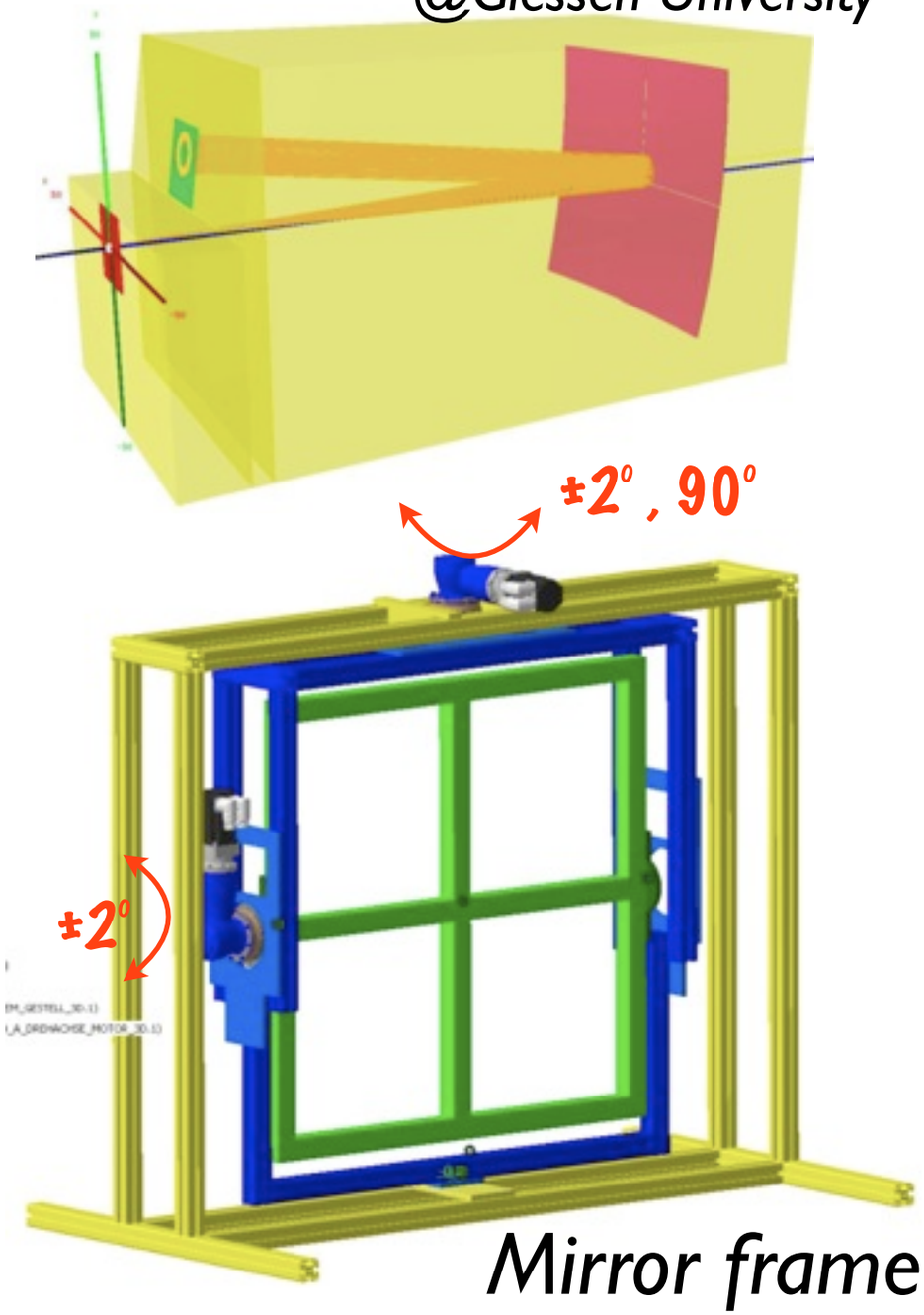
Project :
for Mirror alignment control

CBM-RICH prototype
@Giessen University





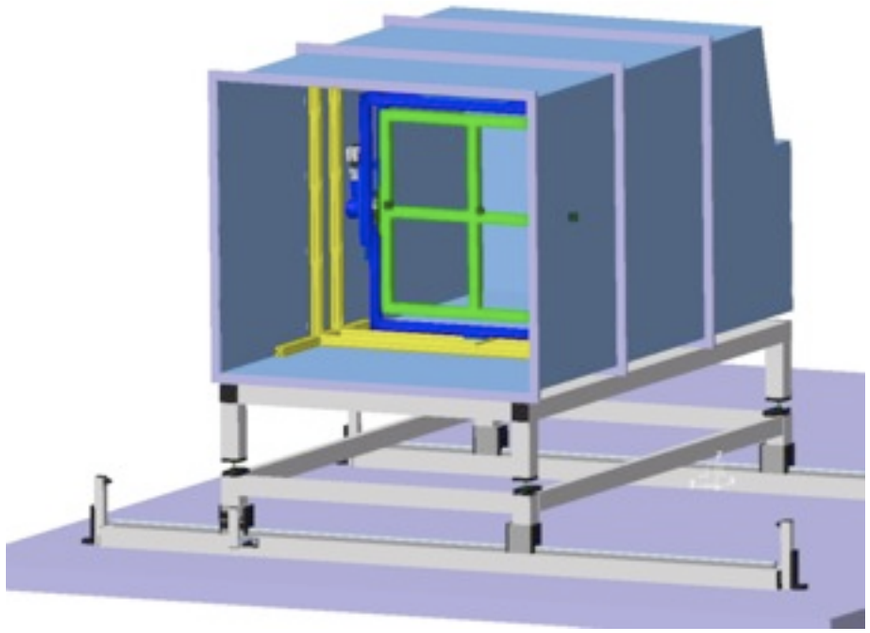
~20kg

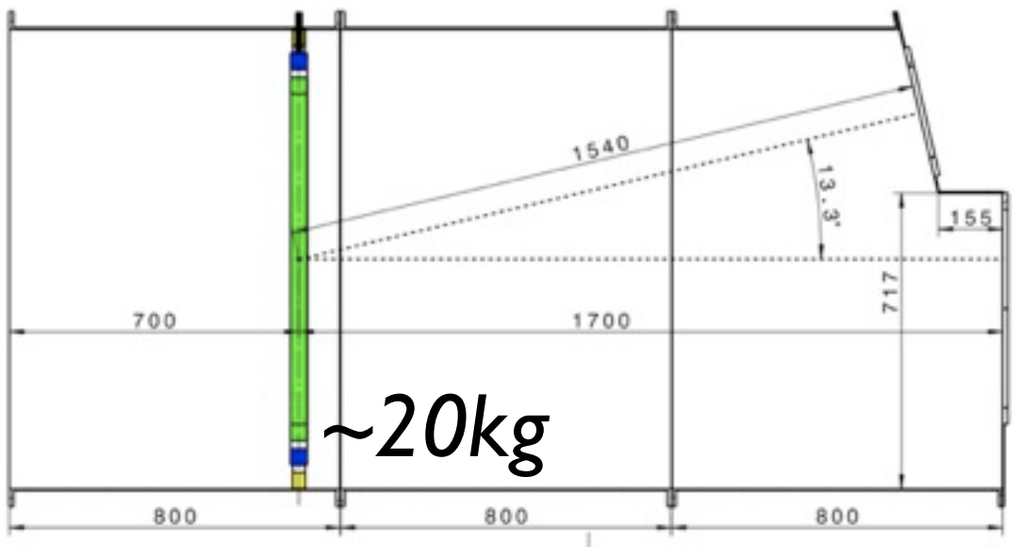


Mirror frame

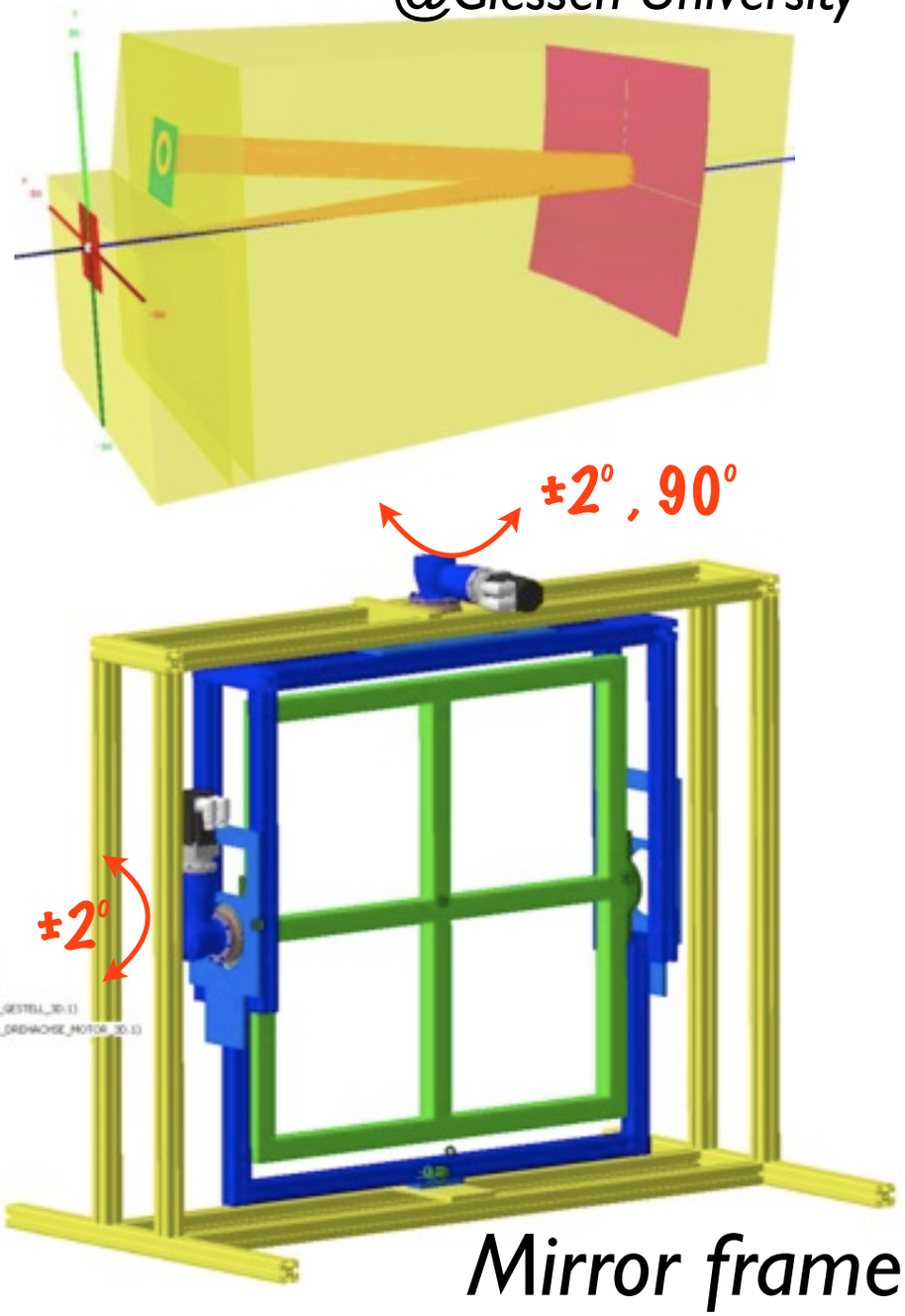
Project :
for Mirror alignment control

CBM-RICH prototype
@Giessen University





~20kg



Mirror frame

Project :
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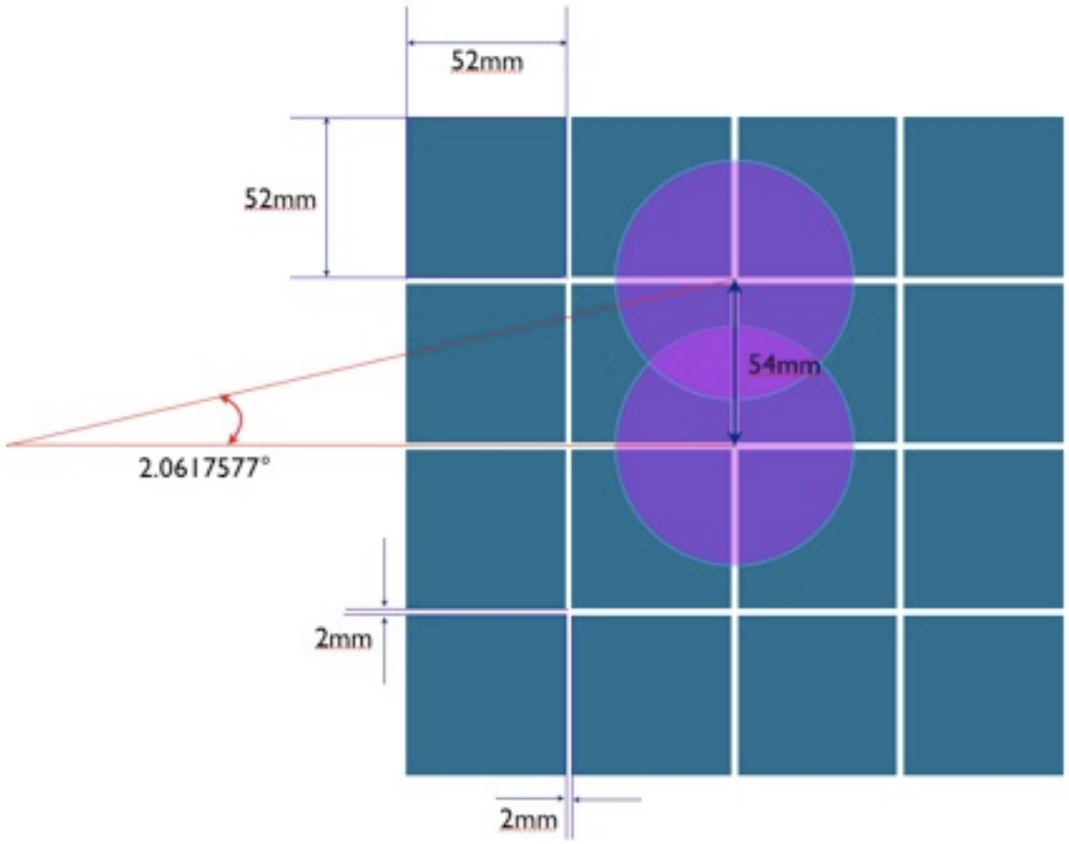
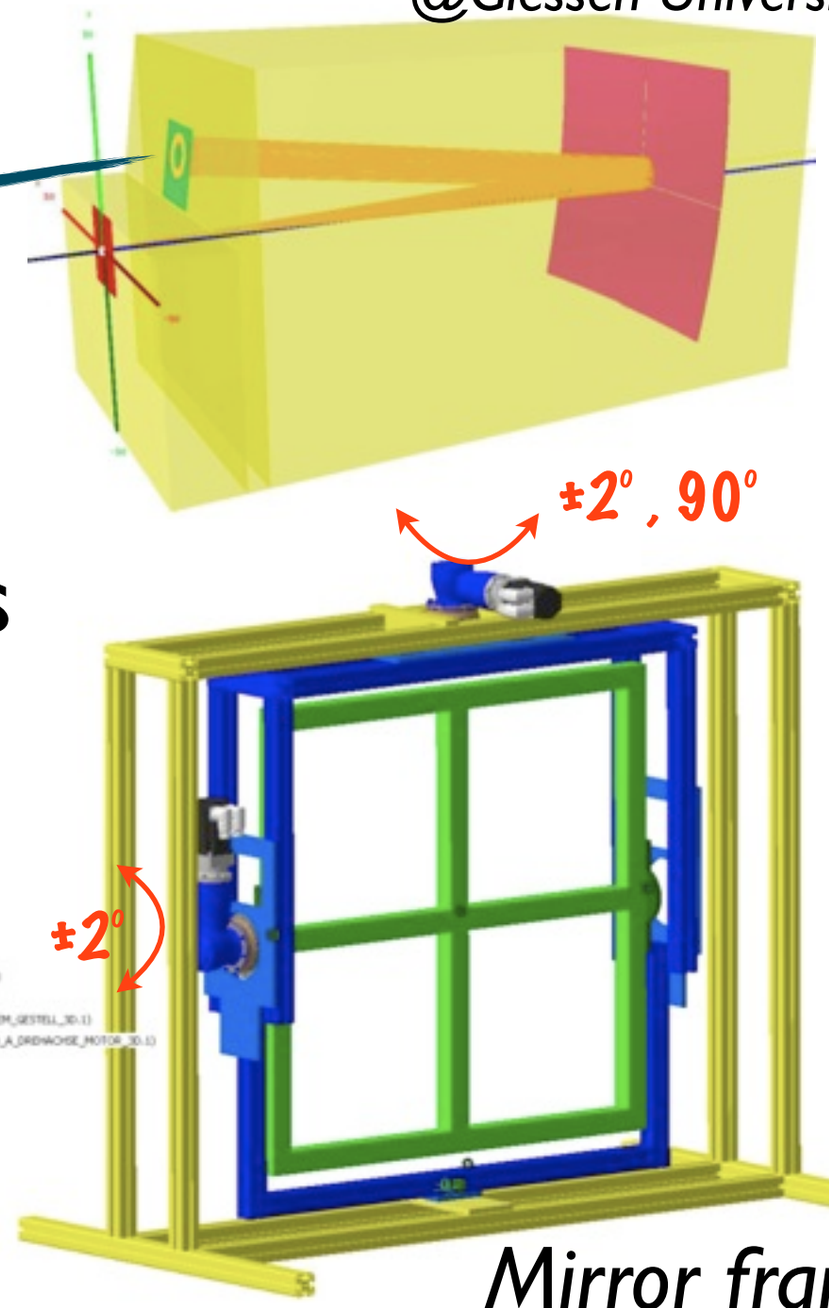
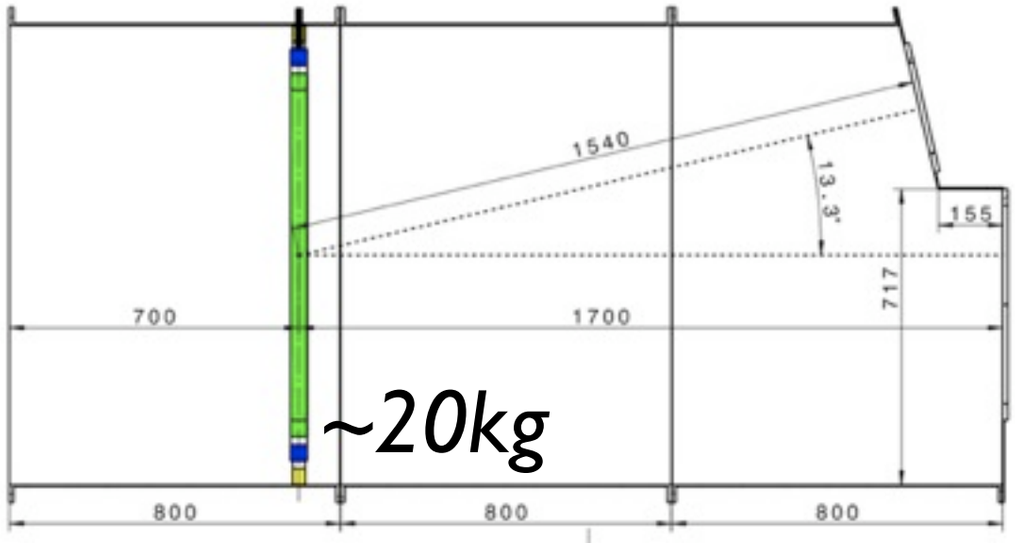


MAPMTs

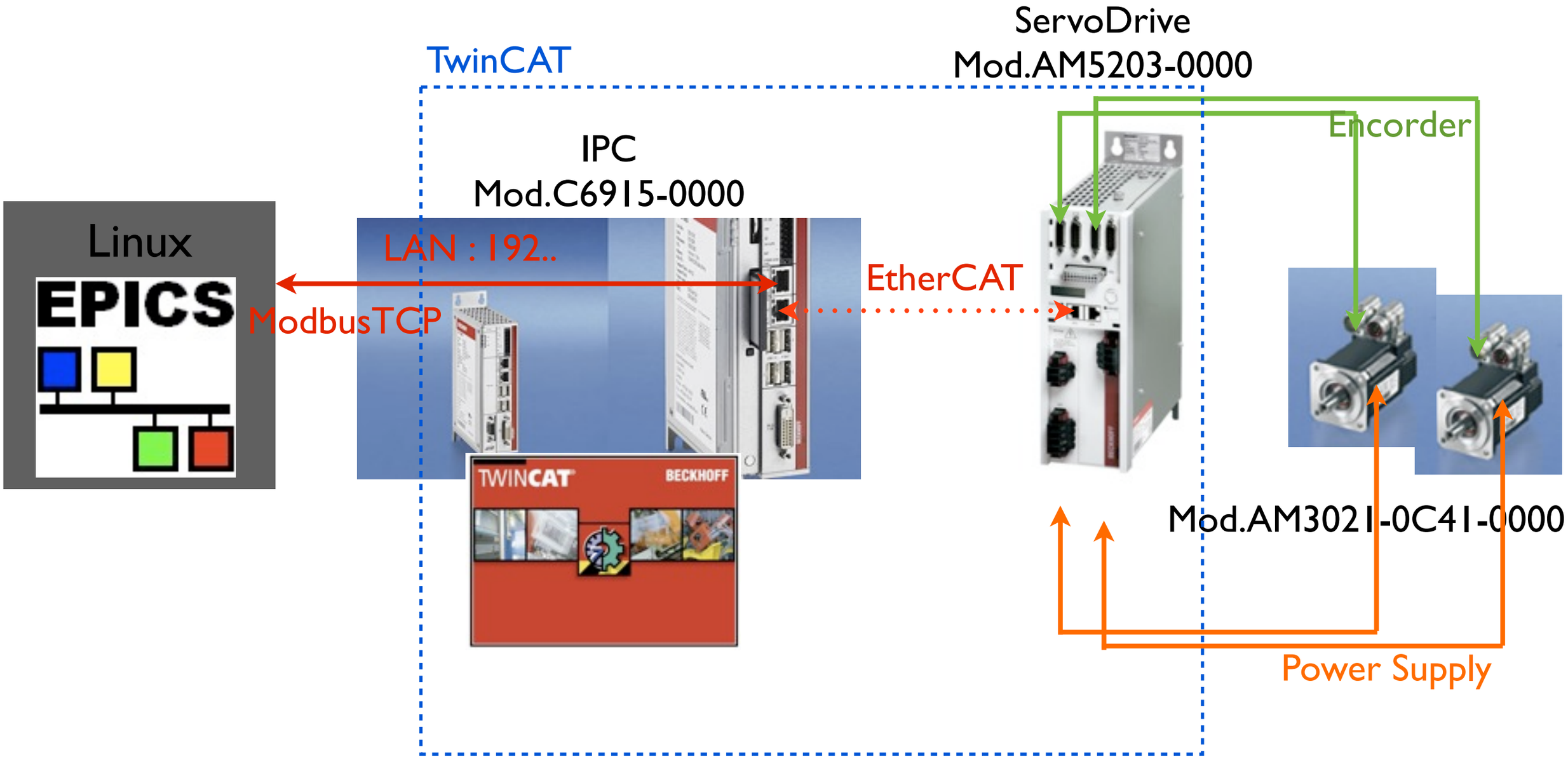


Mirror frame



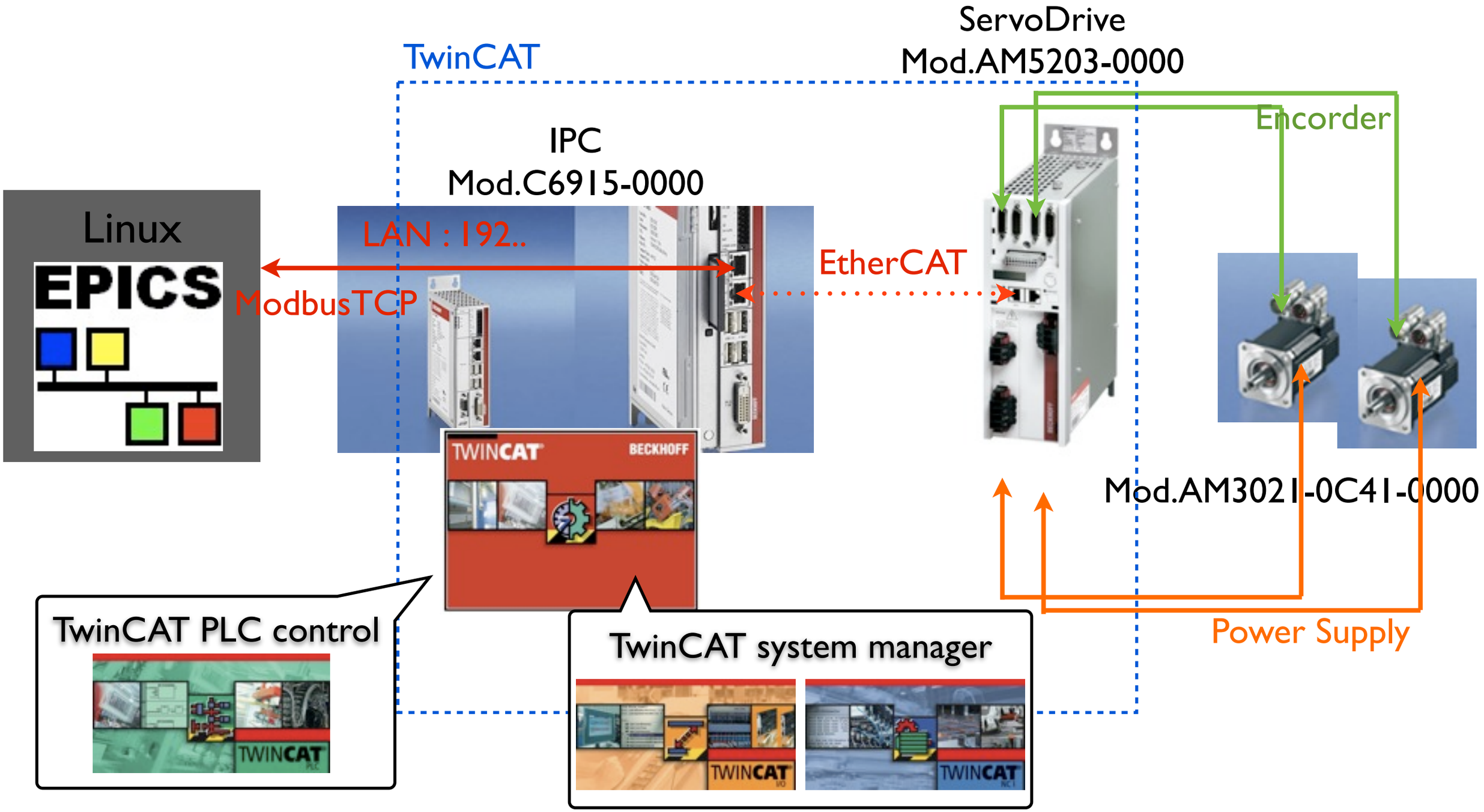
~20kg

Scheme



- TwinCAT : The Window Control Automation Technology.
- EPICS : Experimental Physics and Industrial Control System.

Scheme



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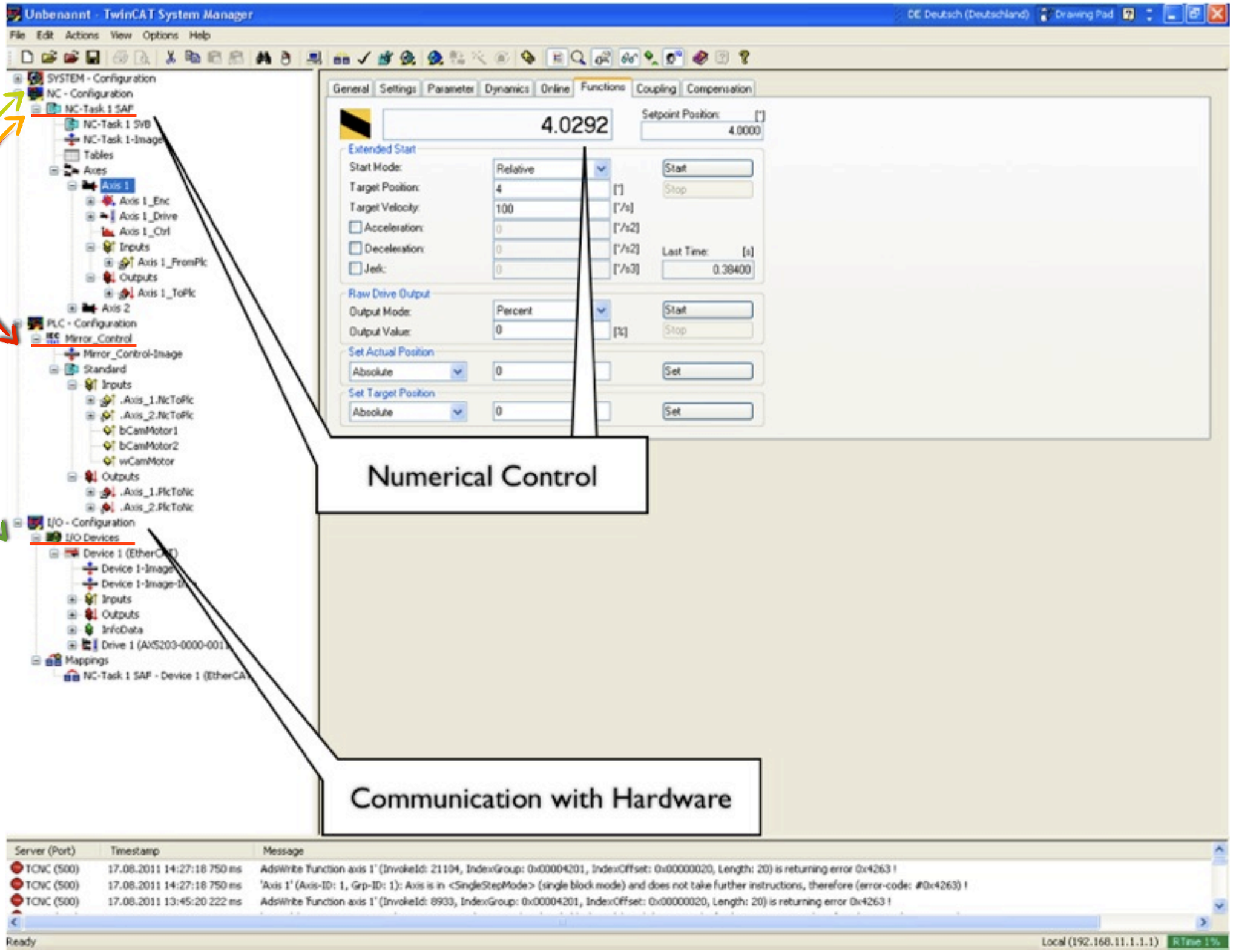
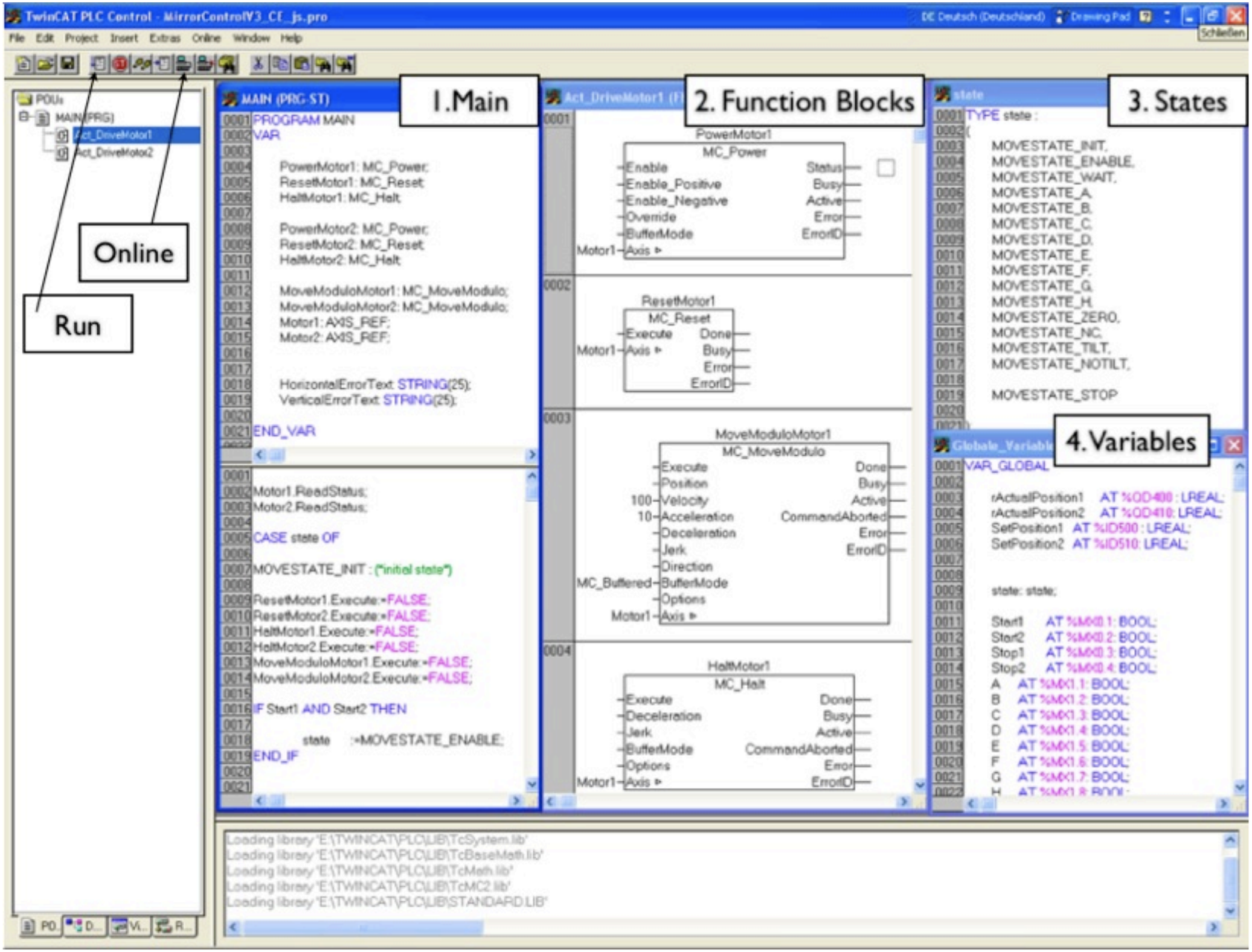
TwinCAT system Manager



TwinCAT PLC control

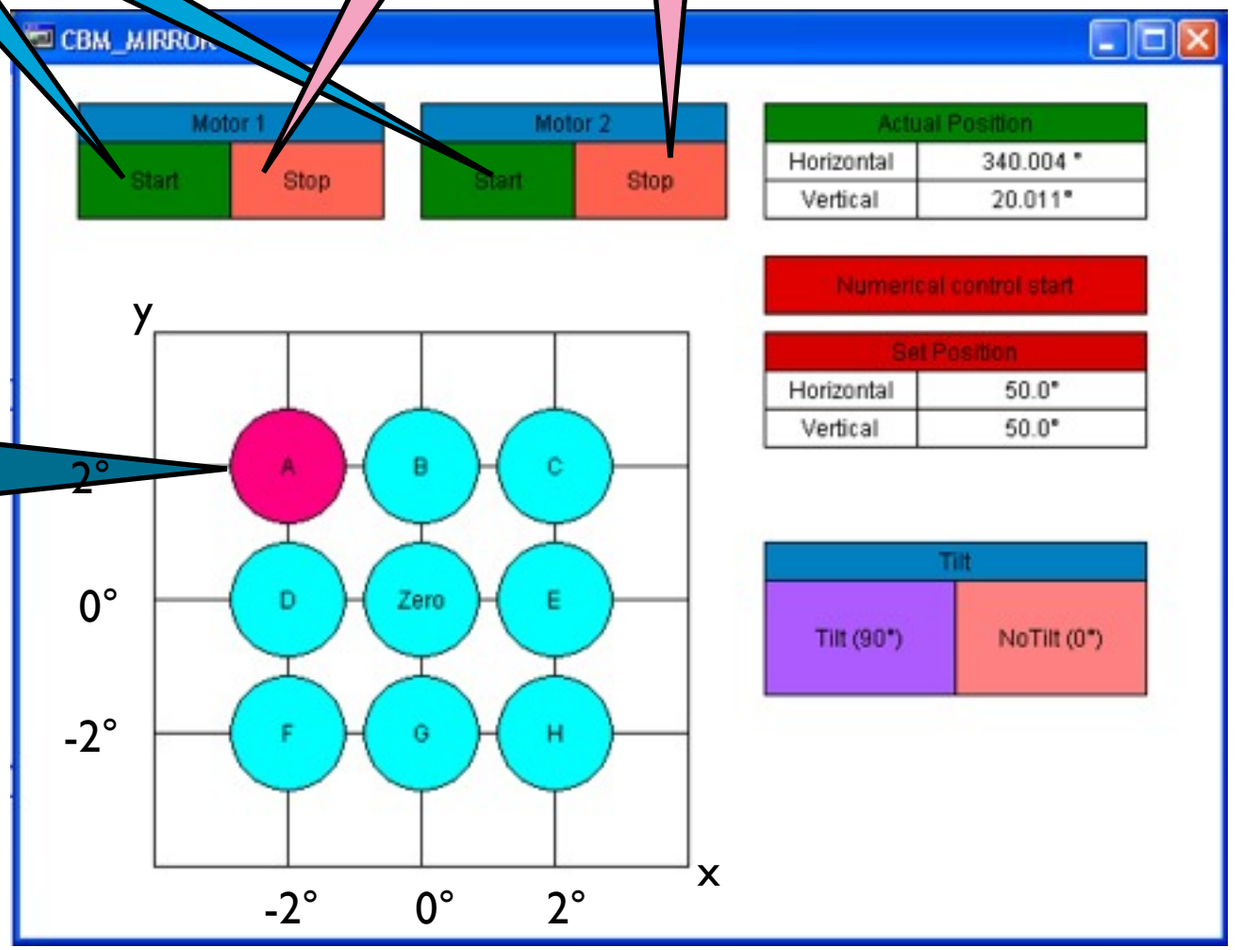


Control Panel

1.Start

2.Stop

3.If you click button A, mirror will be moved and you can see the ring image in this position.



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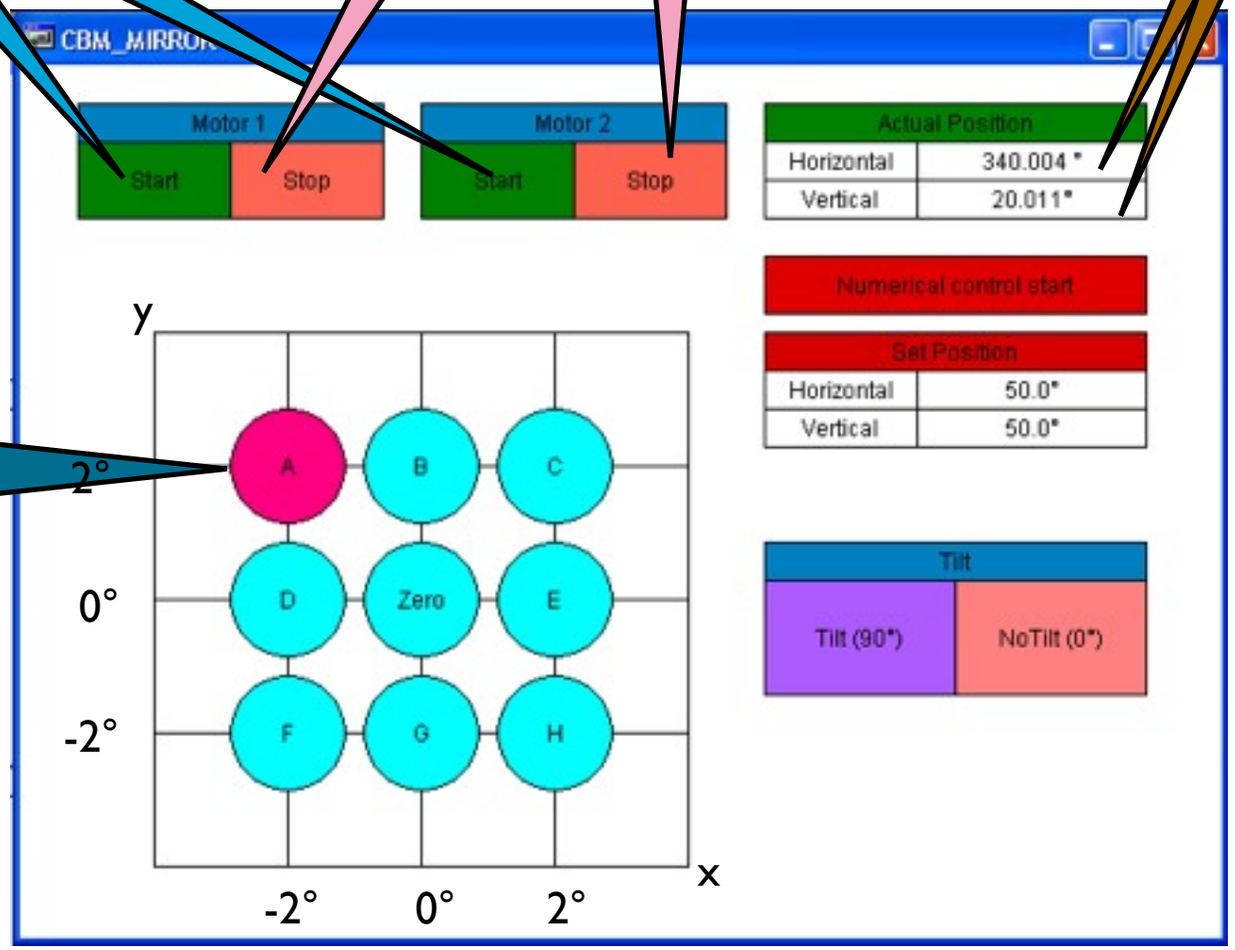

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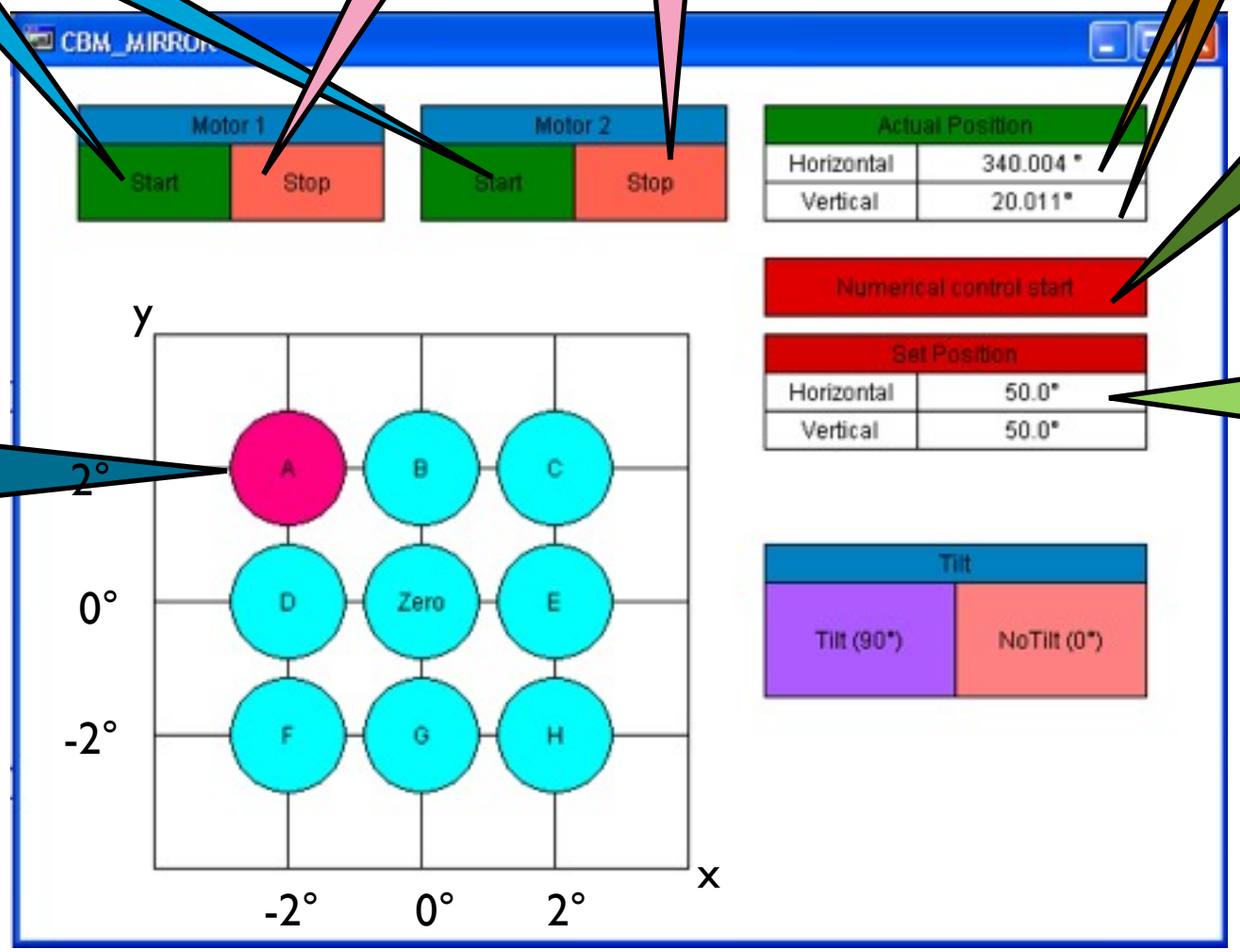

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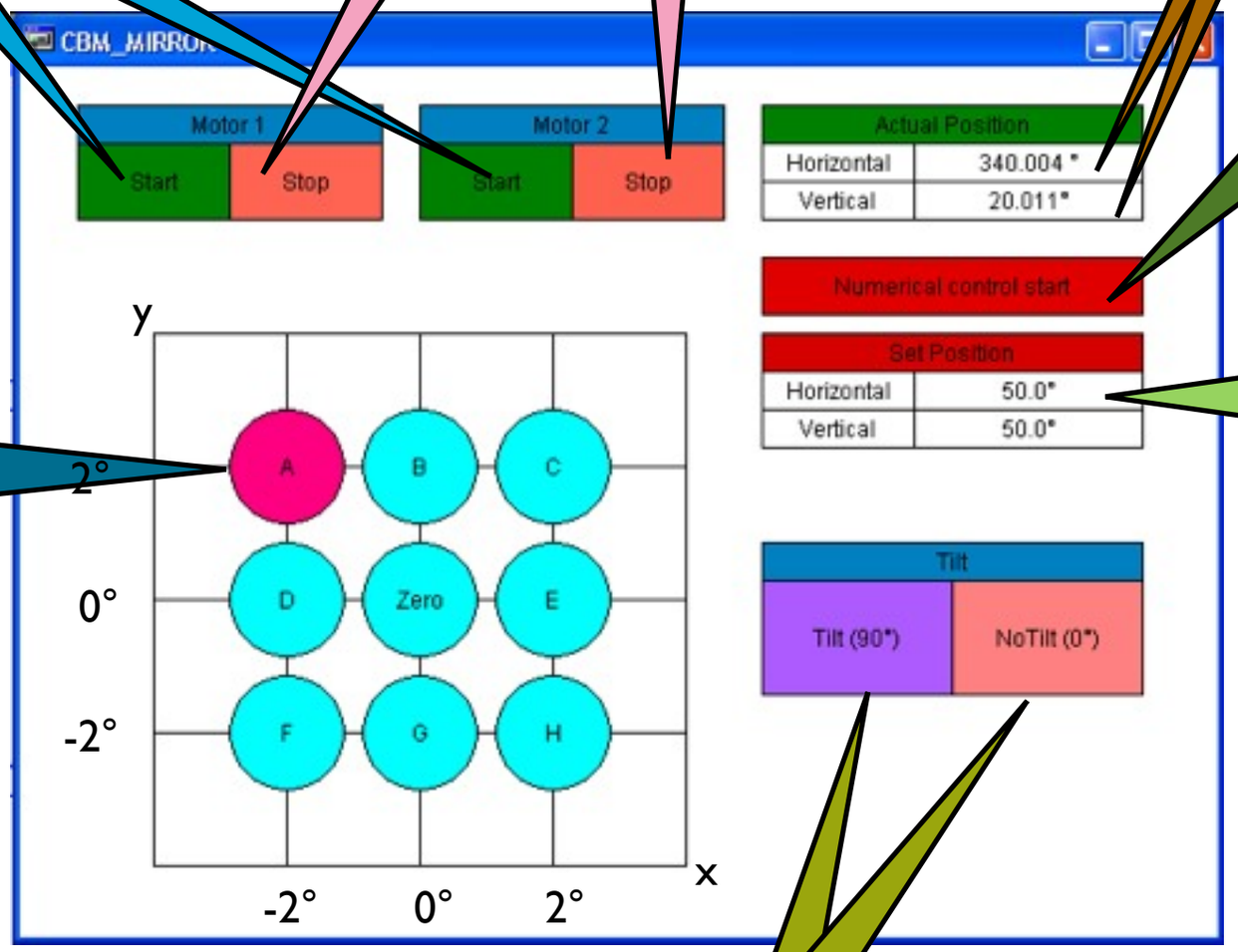
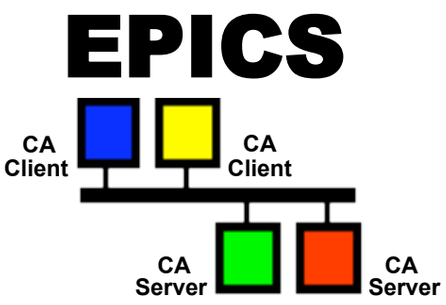
7. for Tilt(90°,0°) NoTilt(0°,0°)





EPICS architecture

Network based Client/Server model

EPICS Client e.g. CSS

Channel Access

EPICS server

modbus TCP connection

Hardware

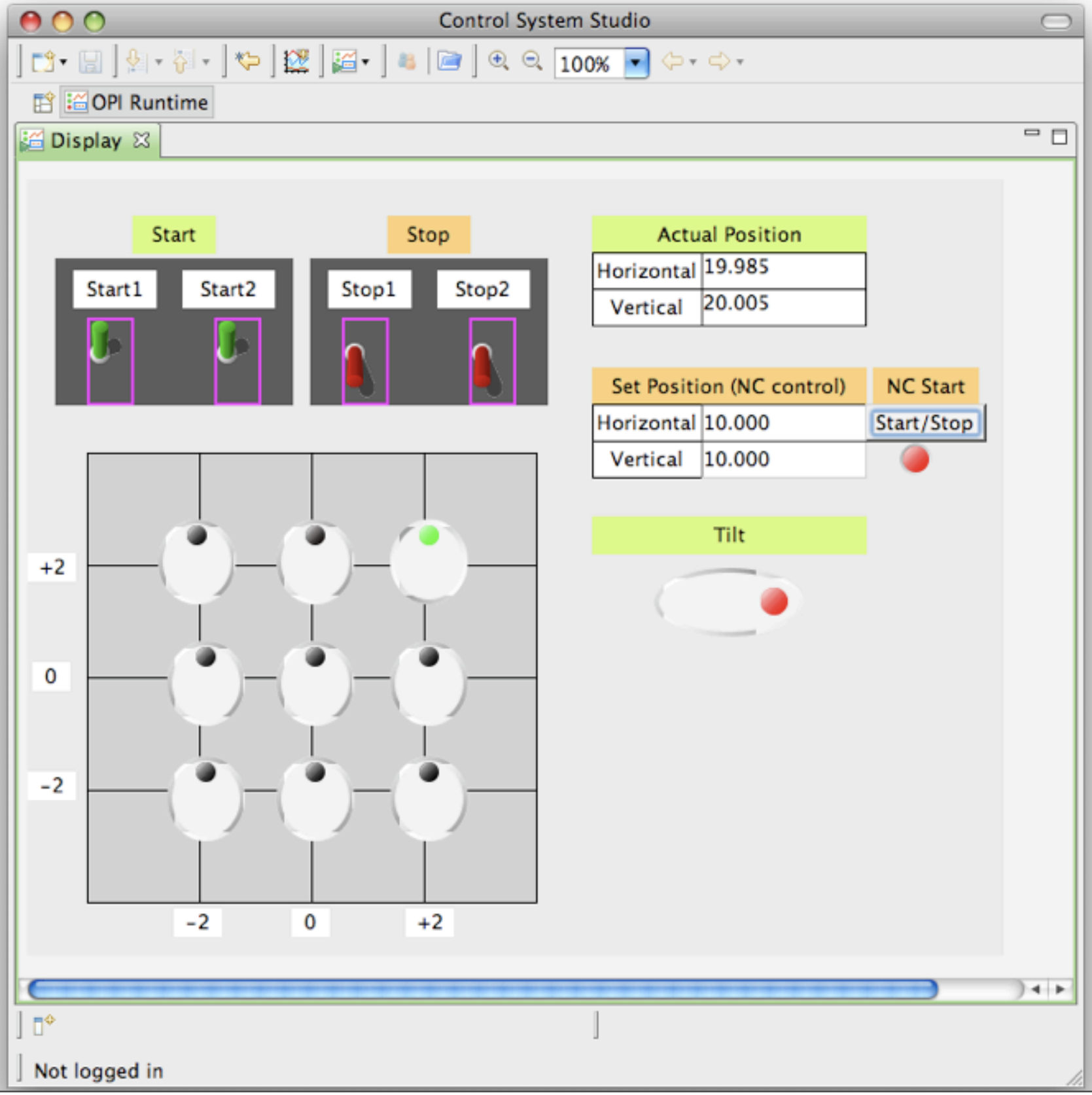
LAN

IOC (Input Output Controller)

e.g. PC

A server provides information and service
A Client uses the service or asks for information

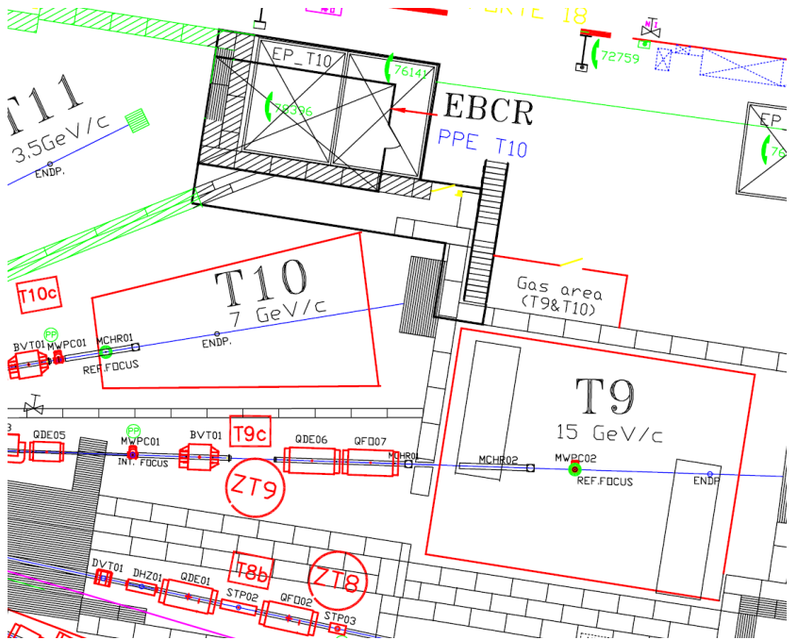
Control Panel



Summary & Outlook

- I programmed mirror positioning control system using TwinCAT and EPICS for CBM-RICH prototype.
- The control system is successfully implemented.
- It will be used for experiment @CERN, T9 in Oct.2011

floor space at T9 for CBM test



Thanks to my advisers.

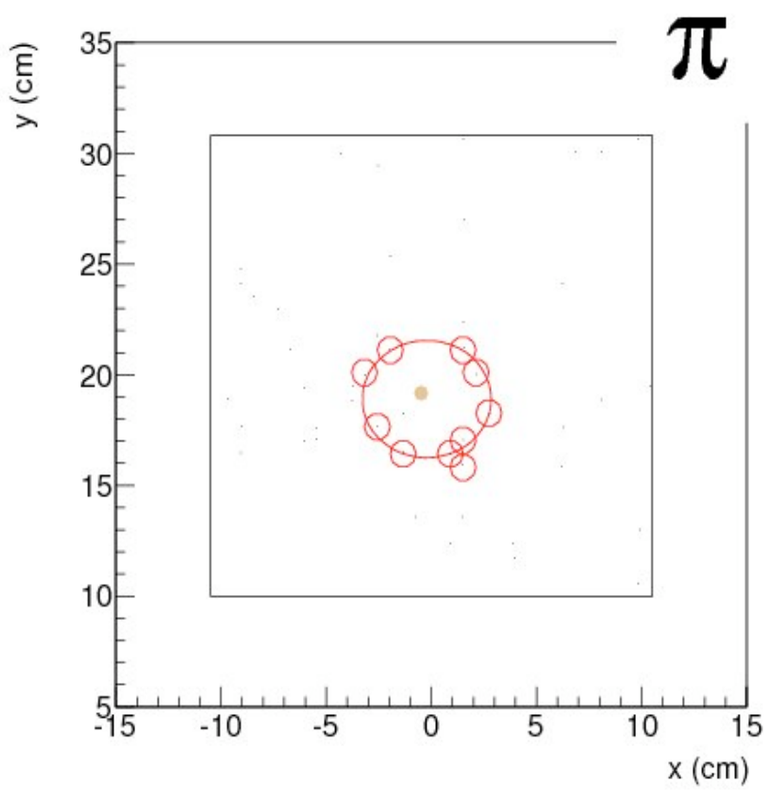
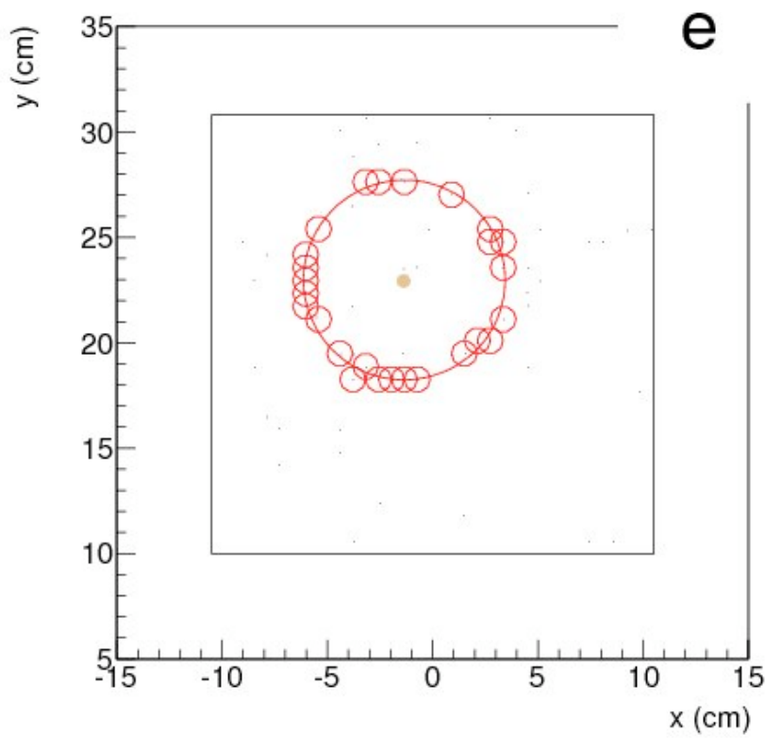
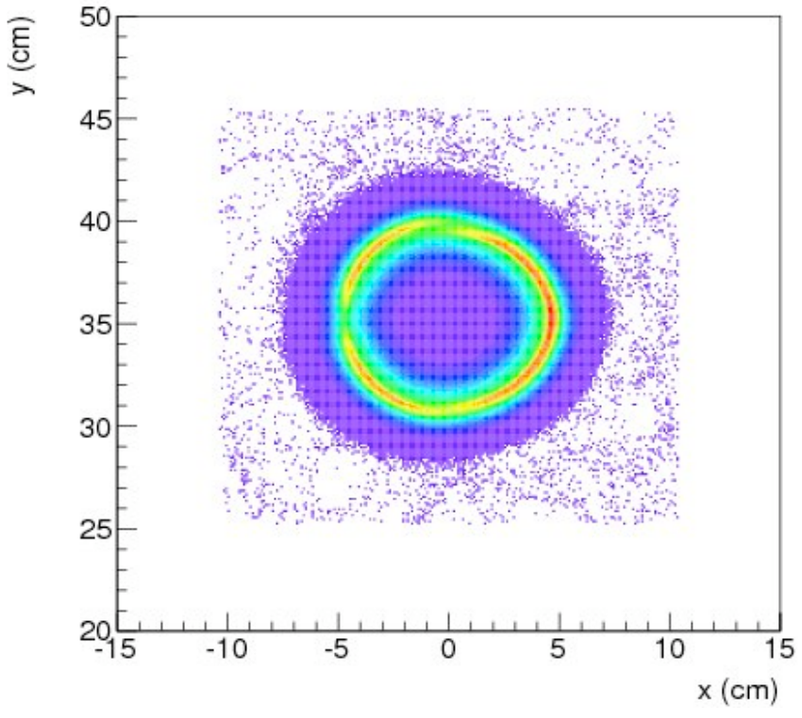
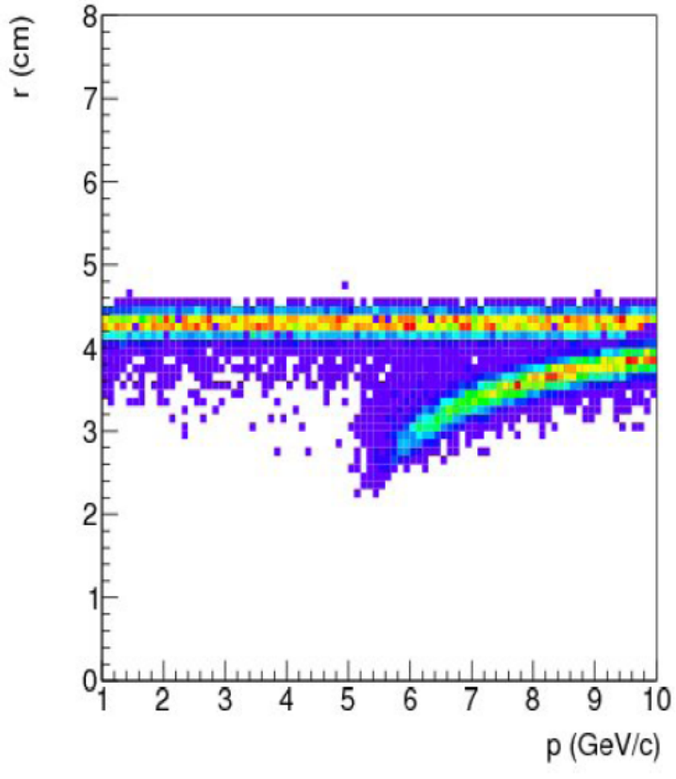
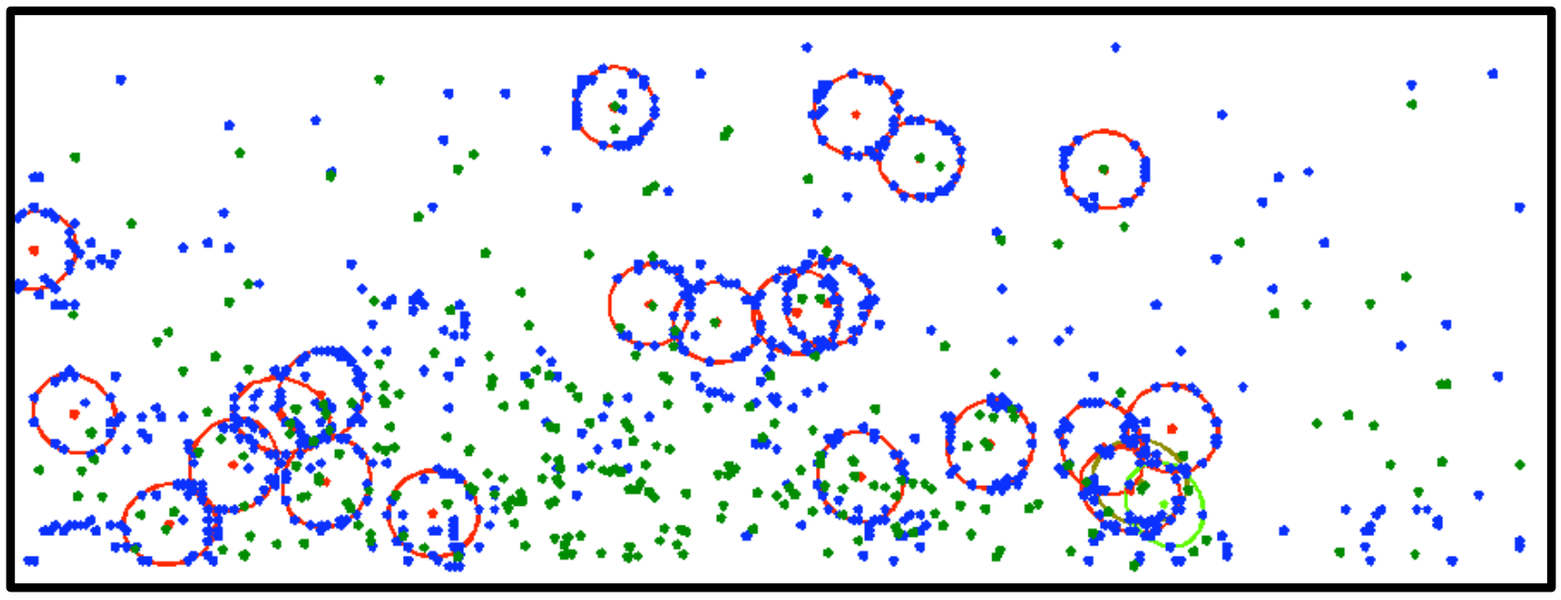
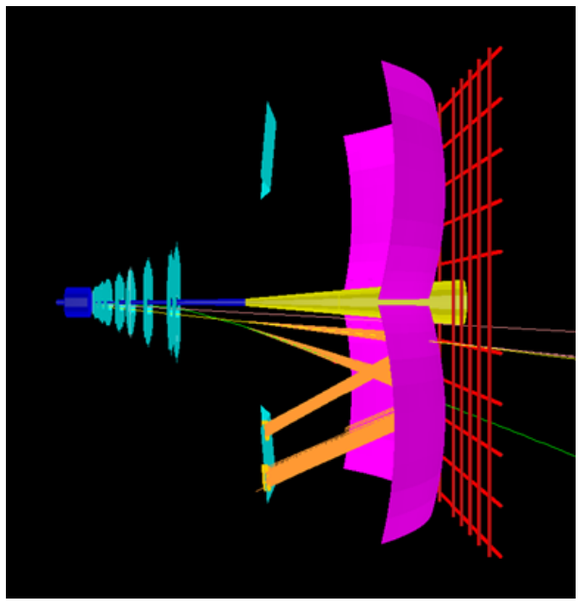
Peter Zumbruch,

Tanya Torres De Heidenreich,

Burkhard Kolb

Back up

Simulation results



single event