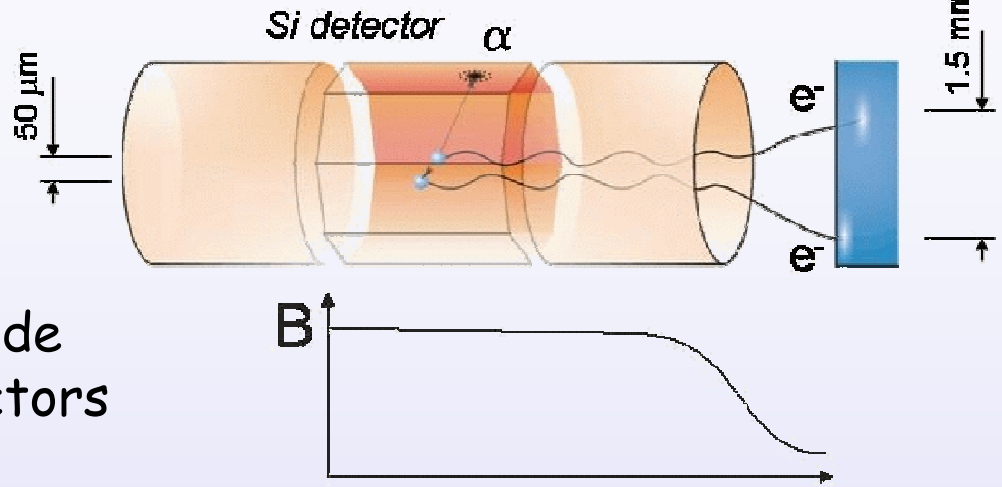
Update on MLLTRAP Progress

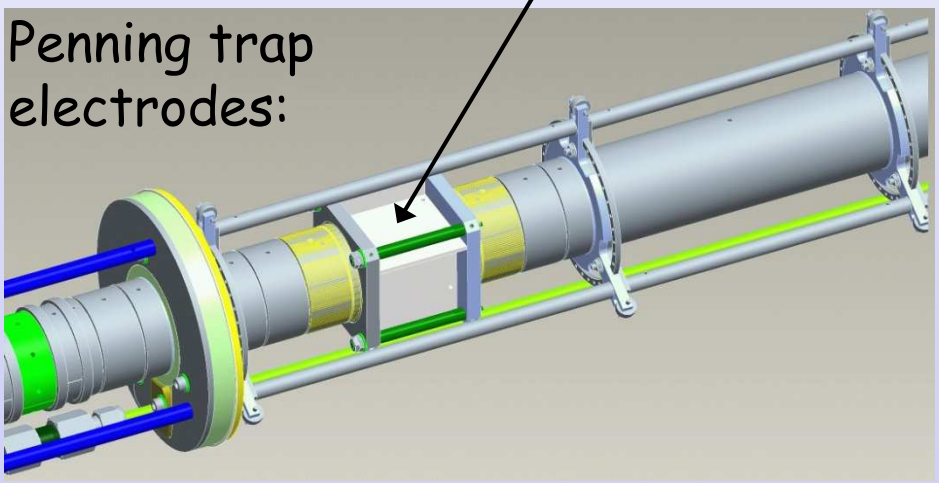
P.G. Thirolf, C. Weber, R. Meißner, J. Moazzami-Fallah, P. Müller
LMU München

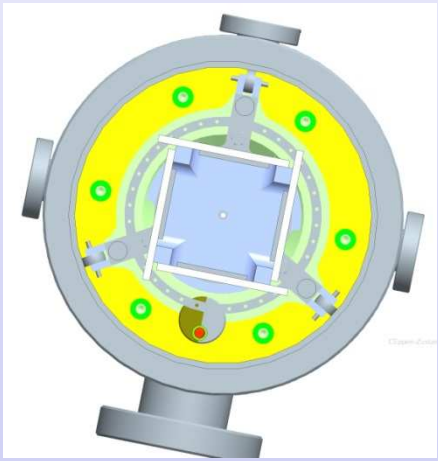
R&D for In-Trap Spectroscopy



Development of ‚Detector Trap':

replace inner Penning trap electrode
by cubic setup of 4 Si-strip detectors



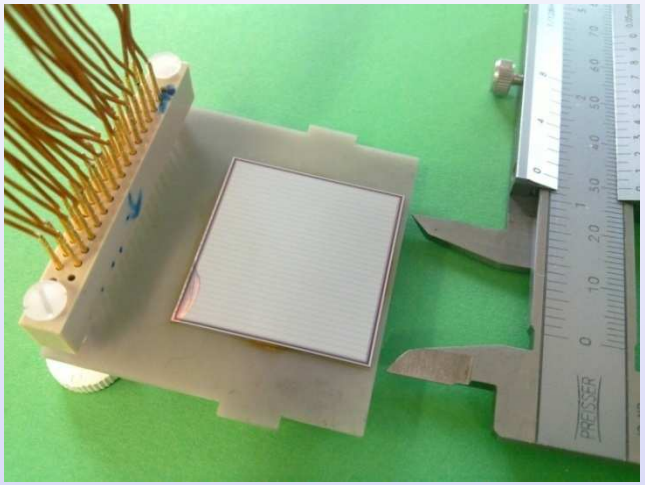


→ enabling in-trap α spectroscopy
(e.g. in coincidence with conversion electrons)

R&D for 'Detector Trap'

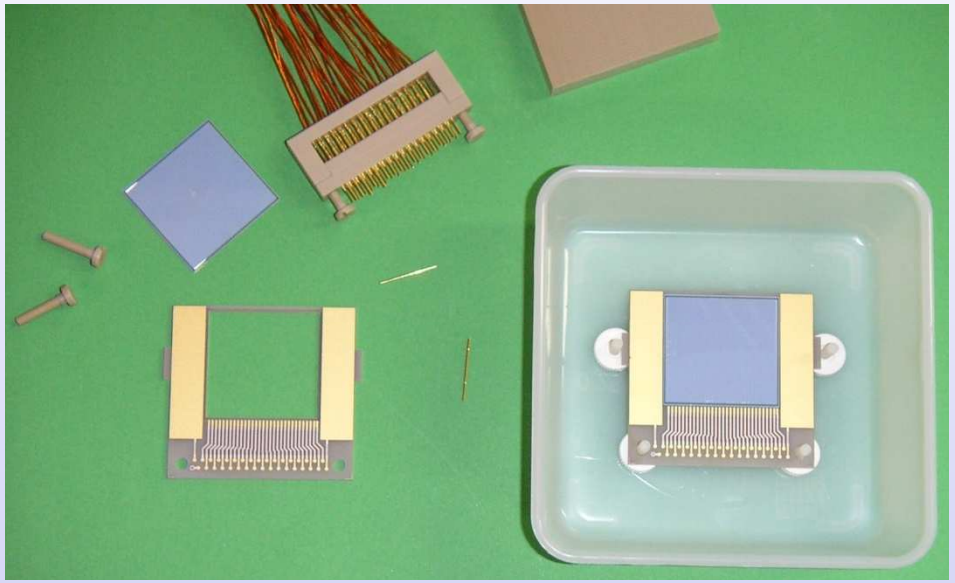
Si strip detector:

→ sensor module with 30x30 mm², 300 μm, 30 strips:



ceramic PCB (AlN):

→ assuring UHV and cryogenic compatibility:



status:

- customized Si diodes available
- glueing, bonding on ceramic board successful
- cryogenic tests with test boards successful

next steps:

- commissioning of detectors in lab and in B-field
- construction of full trap system with detector trap

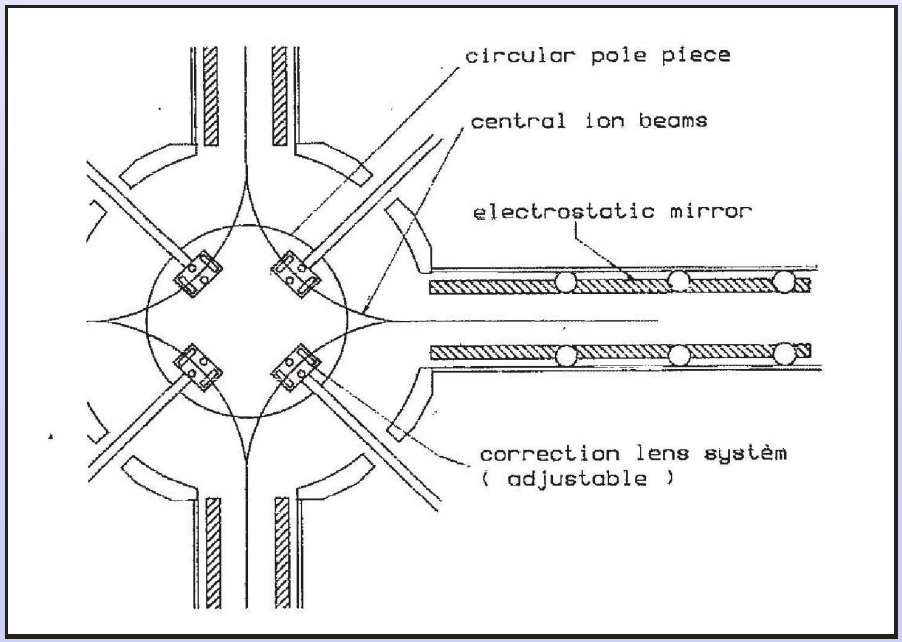
Development of 'Multi-Passage-Spectrometer (MPS)

Multi-Passage-Spectrometer:

→ fast cycling dipole magnet with round pole tip

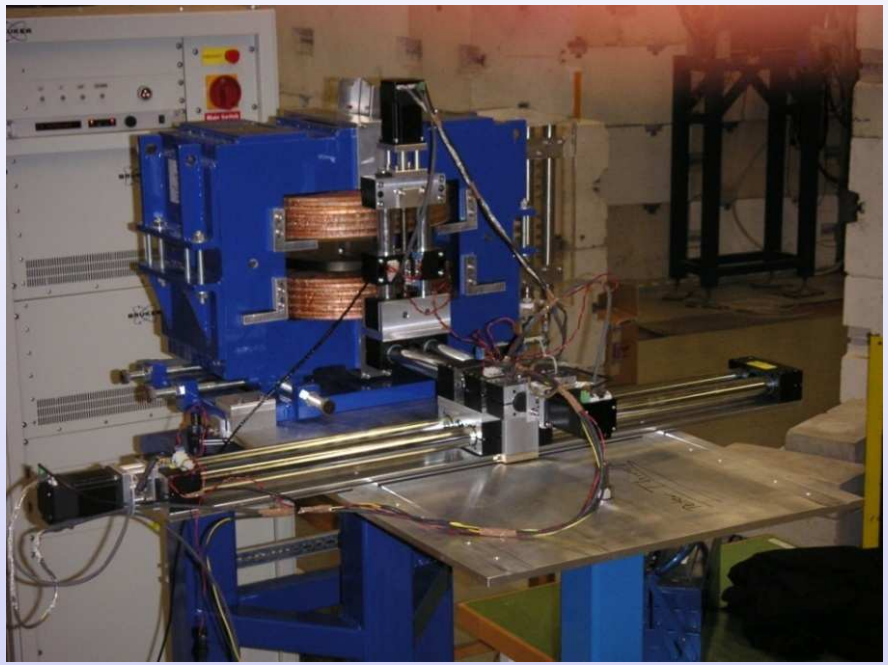
→ q/A separator for future charge breeding

MPS layout:



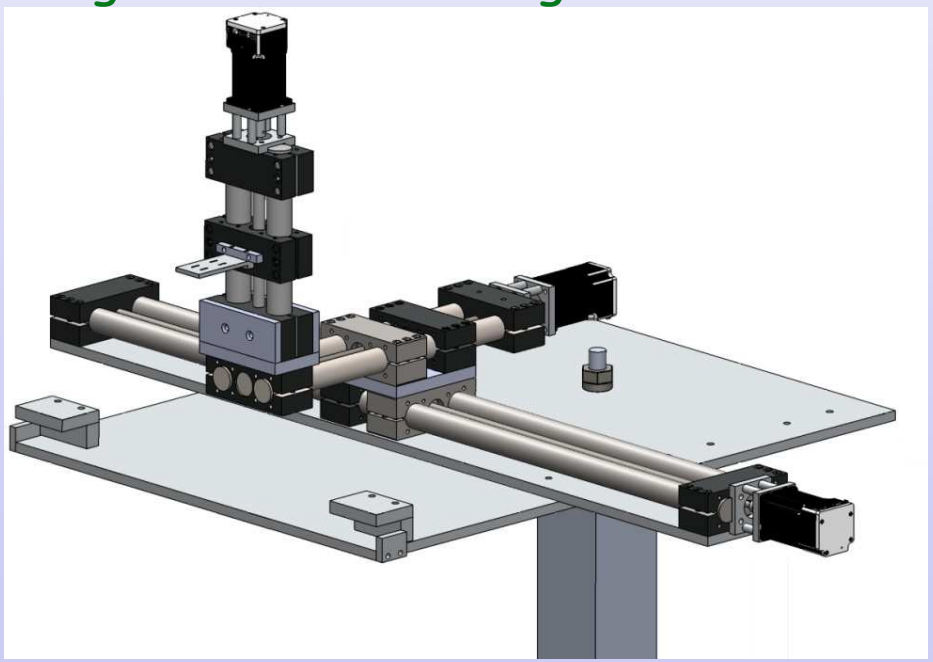
Multi-Passage Spectrometer (MPS)

prerequisite for future use of trap with highly charged ions: q/A separator



- fast cycling magnet:
  from SigmaPhi, 0 - 1.2 T in 50 ms
- laminated yoke: 0.5 mm plates
- round pole tip: diam. 250 mm

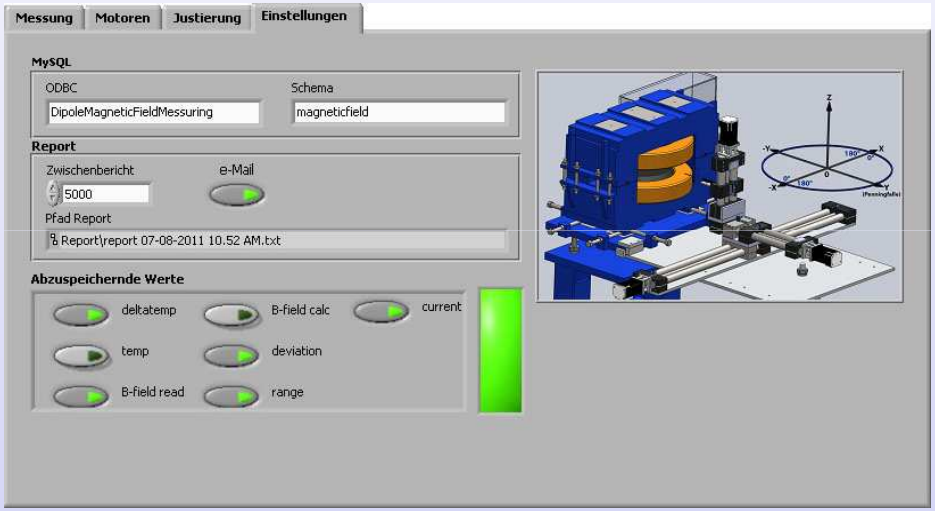
magnet commissioning:



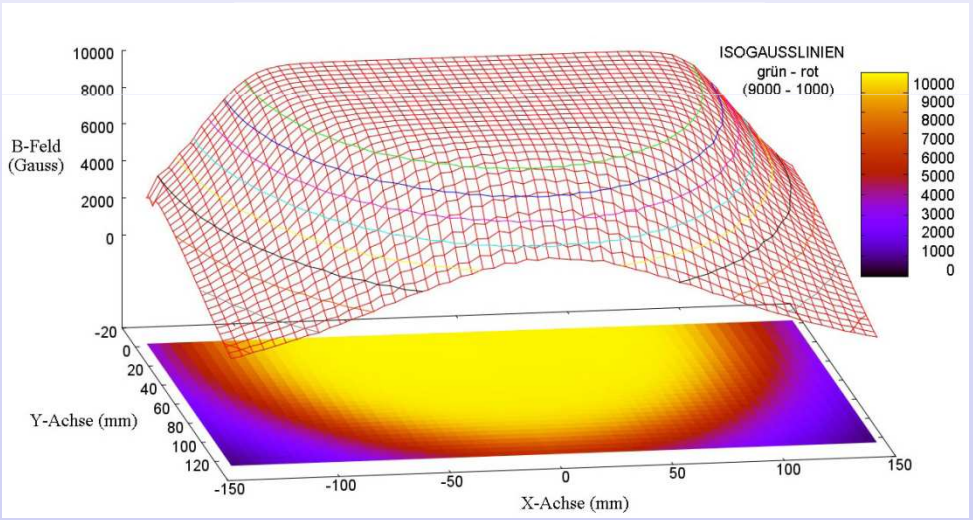
setup for automated 3D-field mapping (1 mm grid) (R. Meißner):

Multi-Passage Spectrometer (MPS)

- field mapping:
  fully automated, LabView-controlled 3D magnetic field mapping
  total: 4 million measurement steps
  (SQL data base, 4 weeks measurement time)



B field map (1 hemisphere):



- next to come: - ion-optical trajectory simulations
  - design and manufacturing of steering mirrors and lenses
  - design and manufacturing of vacuum chamber