Beamtest simulation

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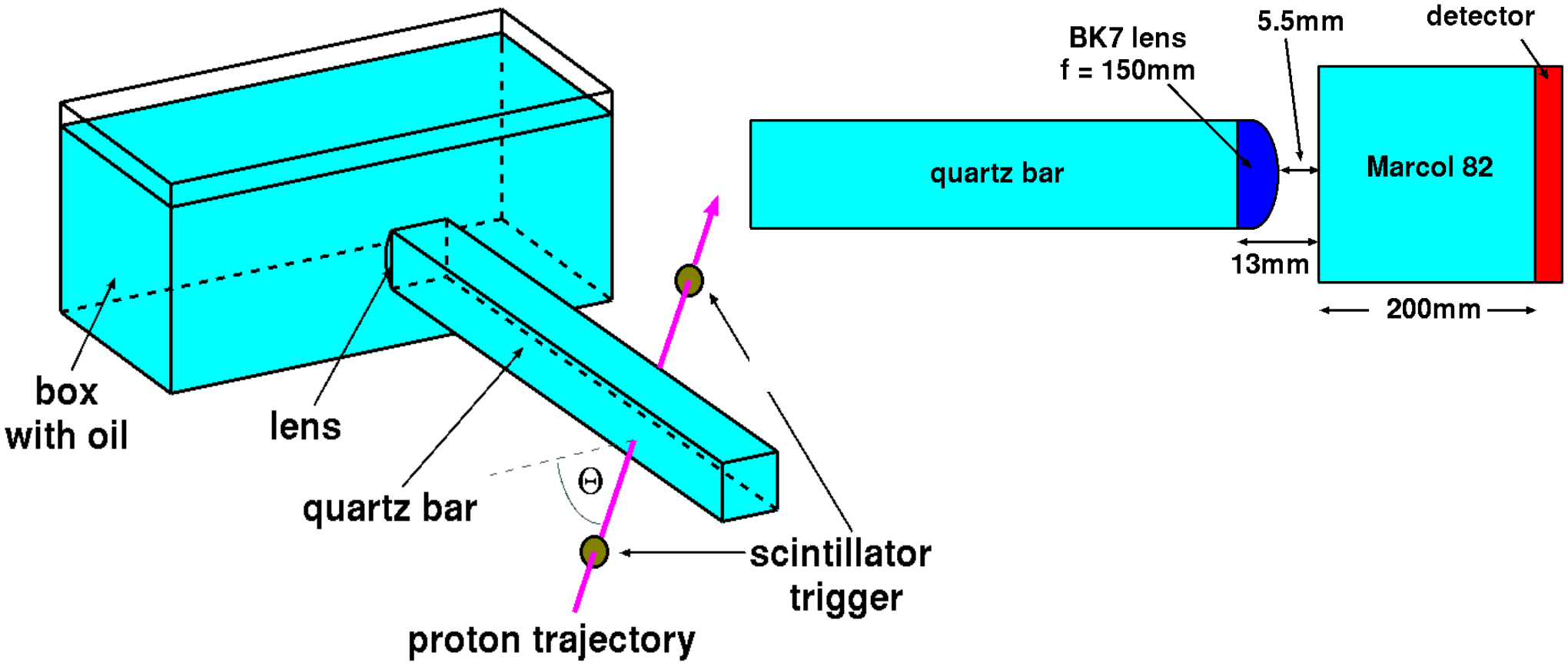
Simulation goals

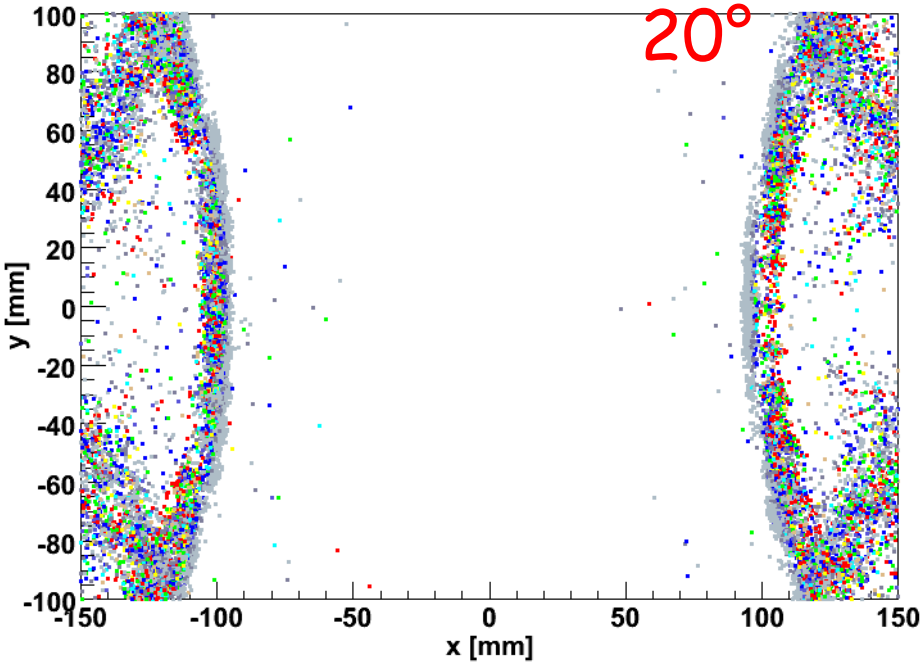
- Which incidence angles are interesting and feasible ?
- How should the 4 MCPs be arranged on the rear fishtank side ?
- Which other options can be tested ?
  - without lens
  - time information for photons flying directly towards detector and those reflected at bar end
  - different beam hit position along the bar

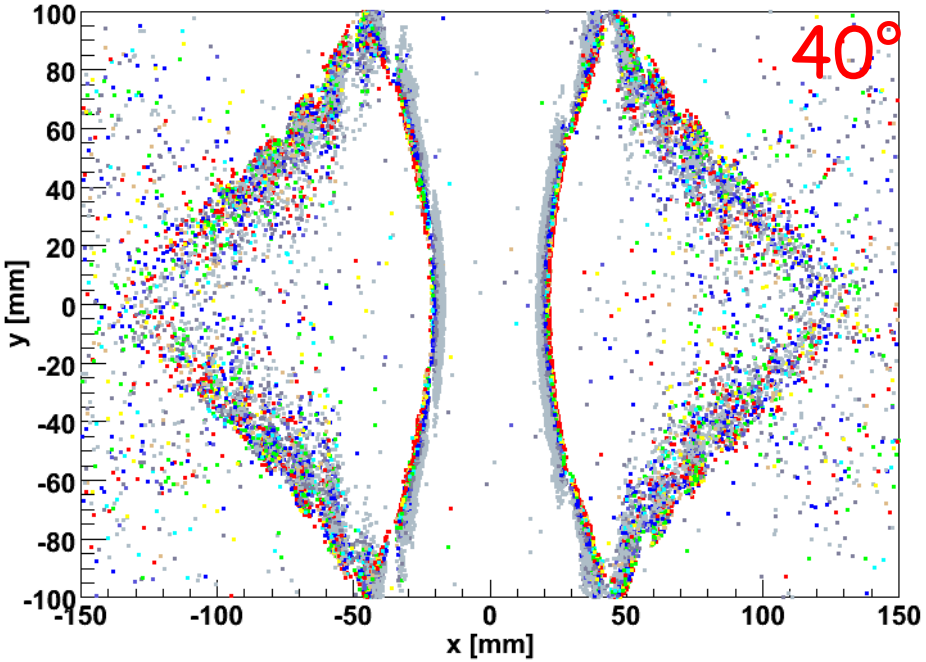
Simulated setup

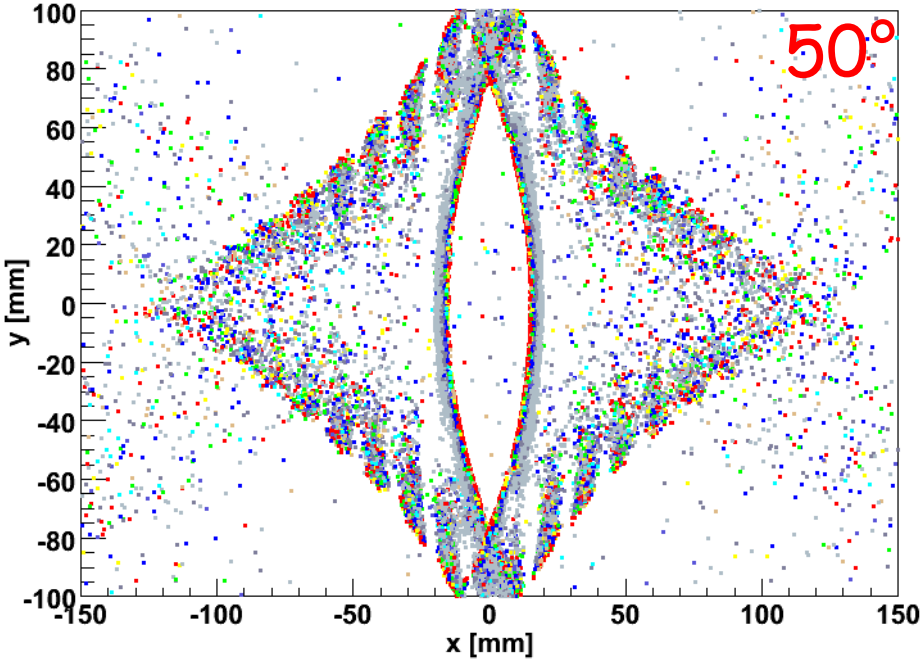


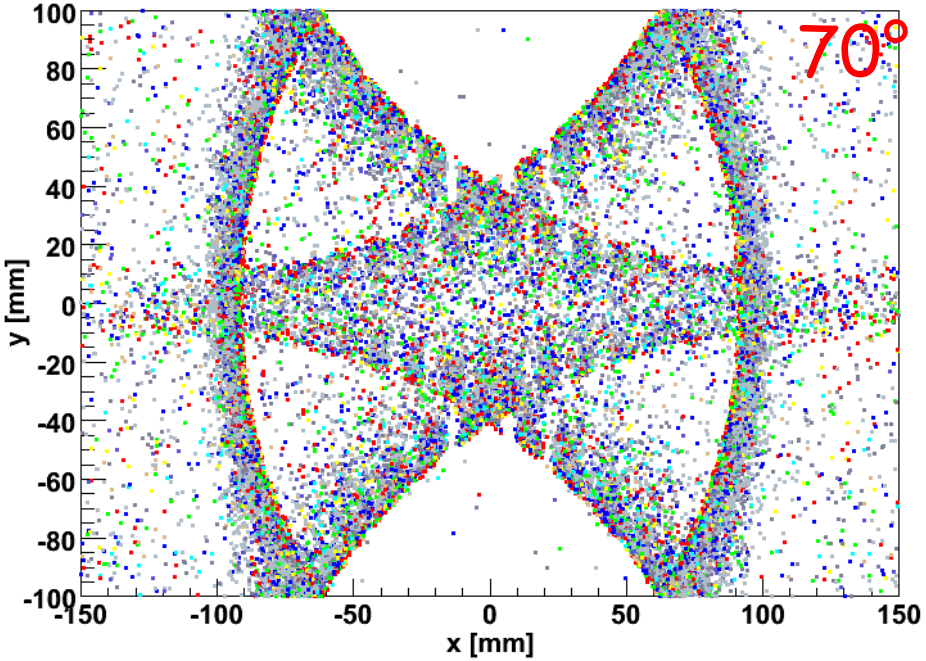
- proton energy: T = 2.0 GeV
- beam spot: 20 mm 1-σ radius
- scintillator diameter: 40 mm
- Cherenkov: 300-700nm
- included Fresnel reflection
- bar is centered to fishtank
- plots always from detector perspective

Different incidence angles

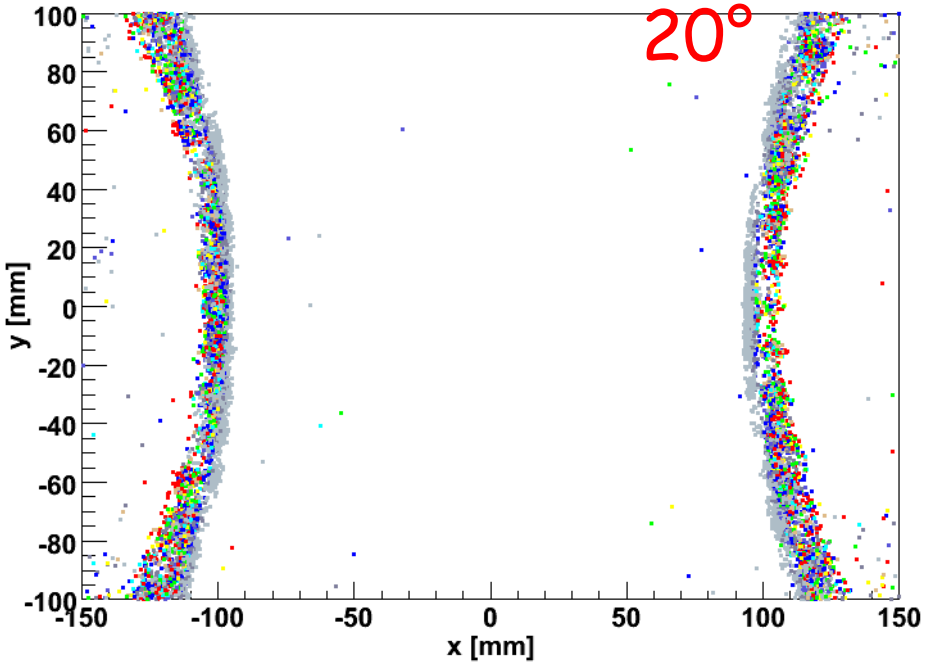


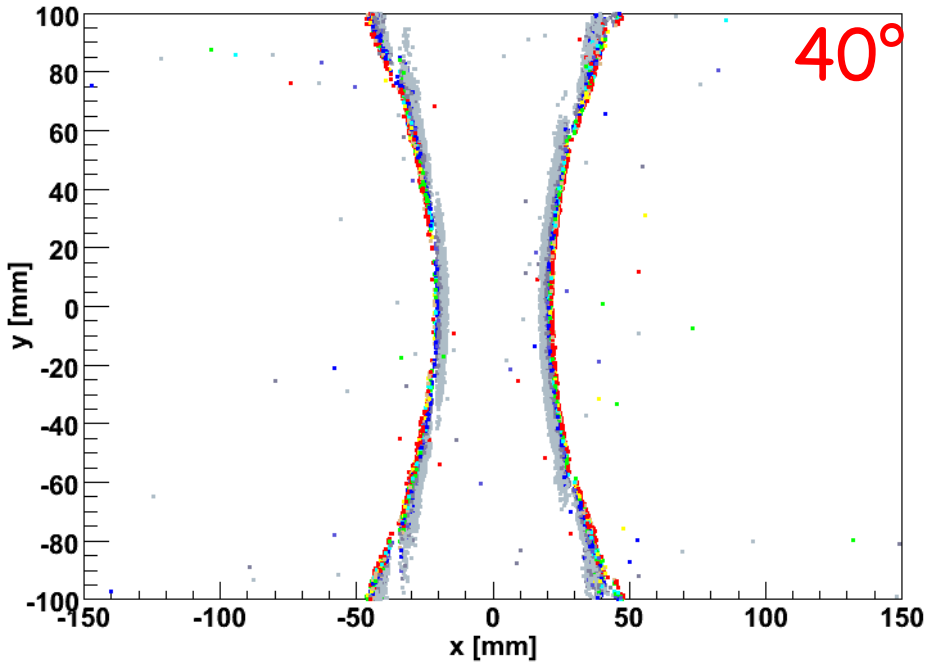


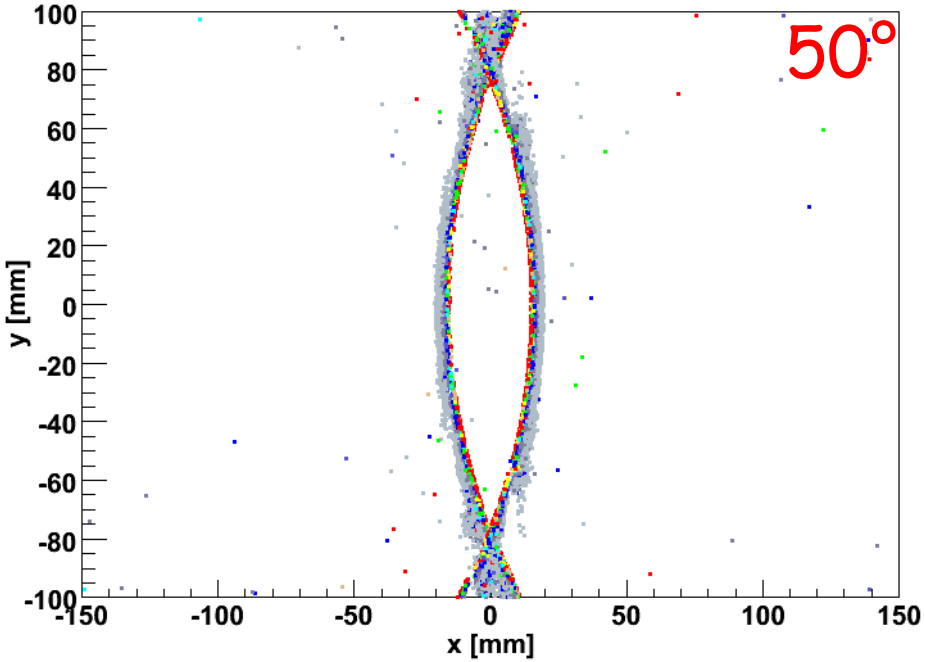


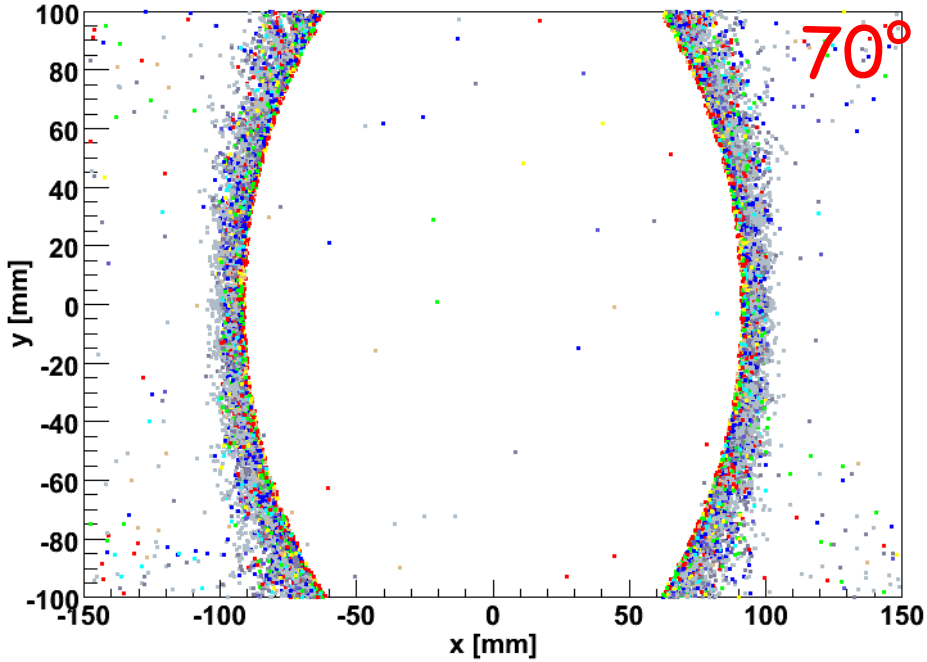


Fishtank bottom and top are blackened





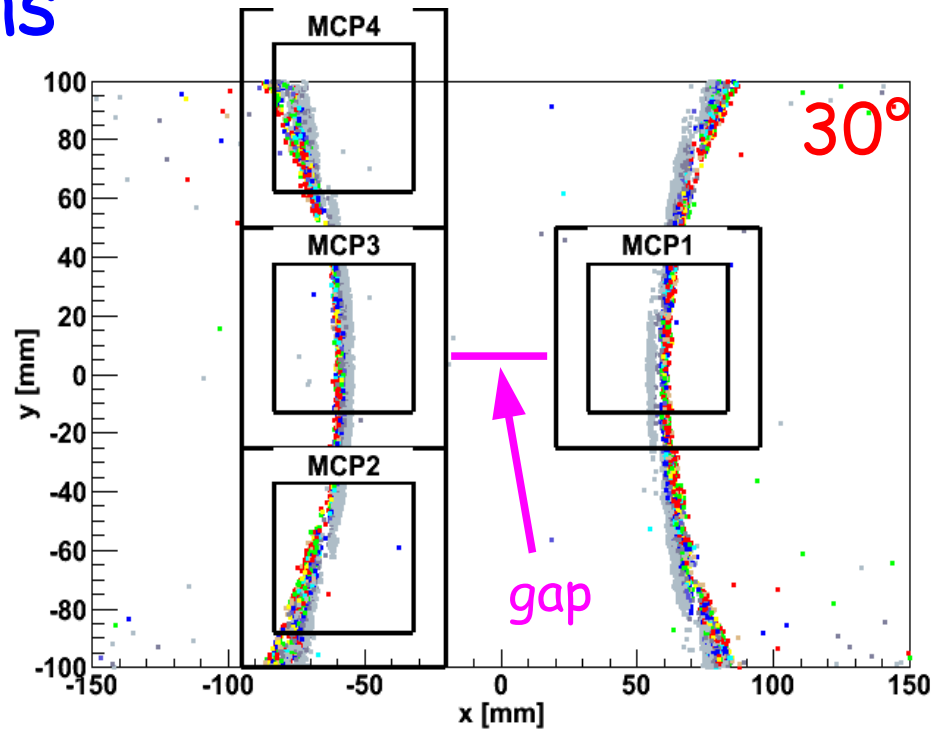




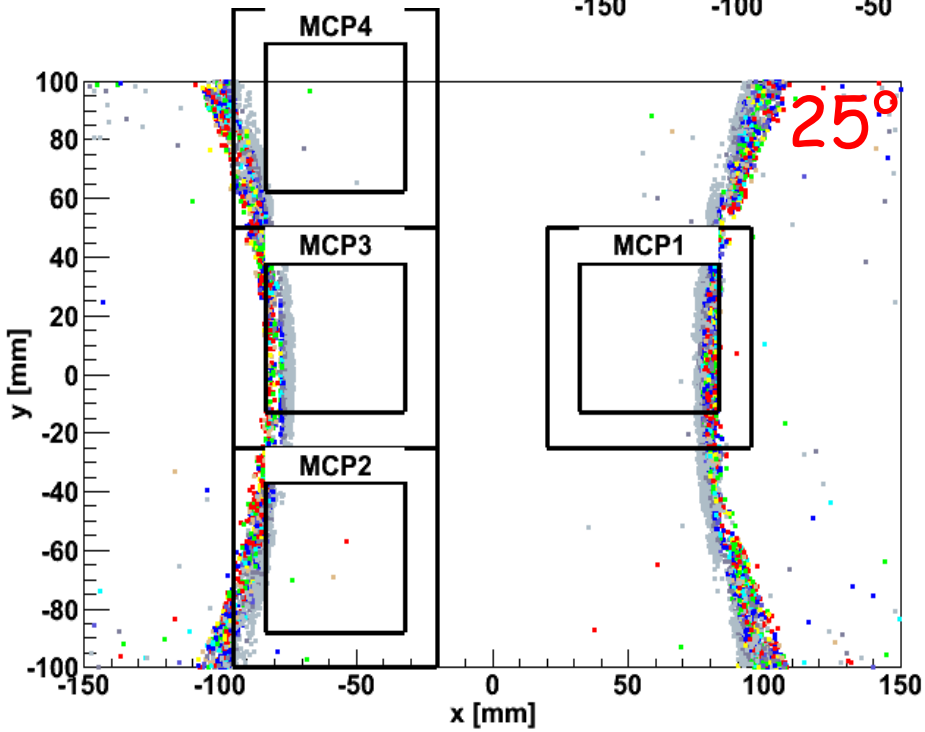
MCP positions

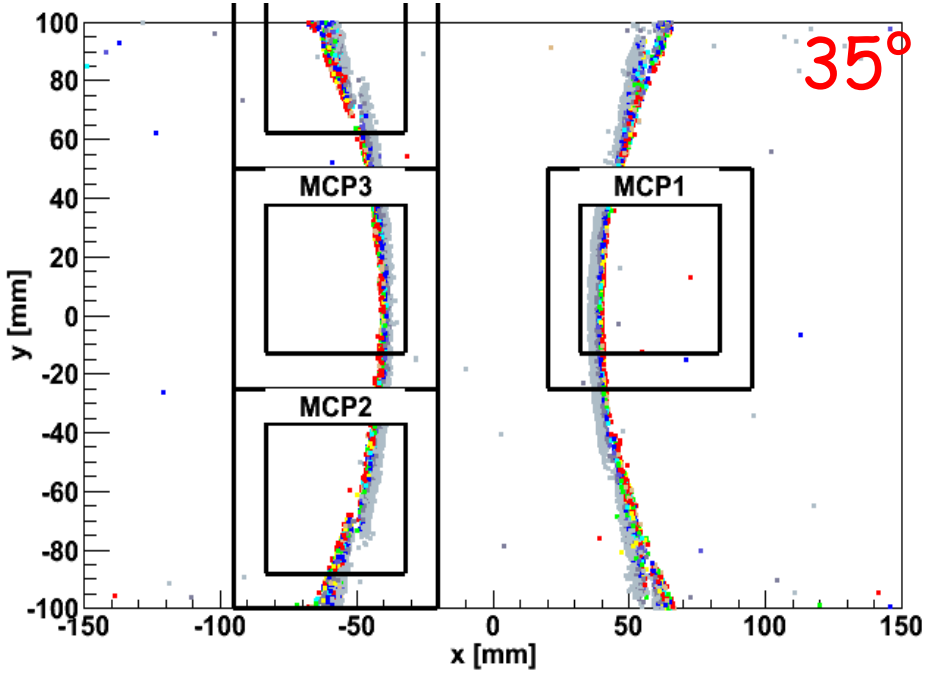
MCP case with holder: 75 mm

gap: 4cm



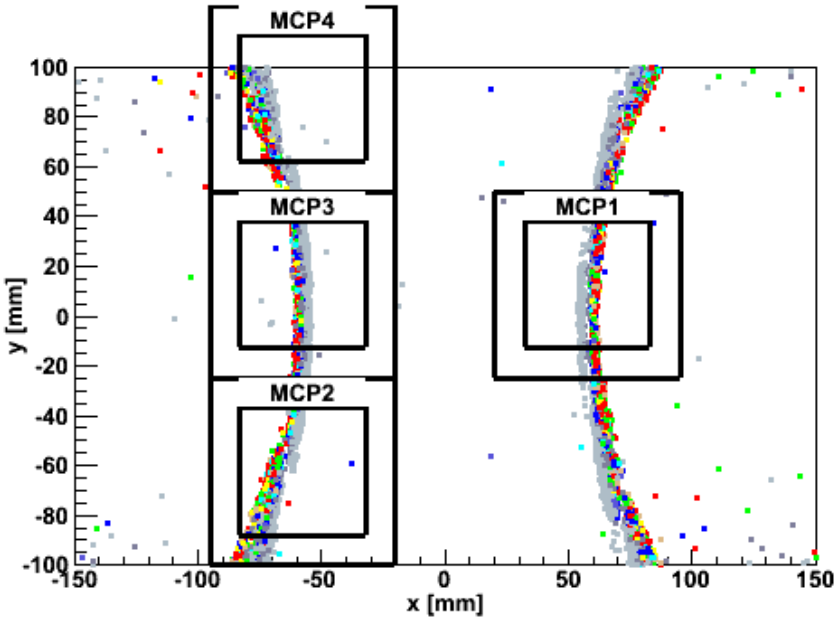
at least 2 pixel rows of MCP4 exceed the fishtank

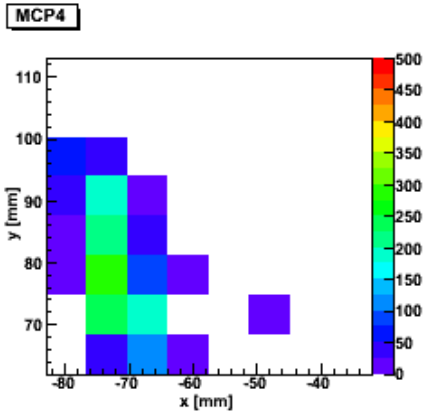


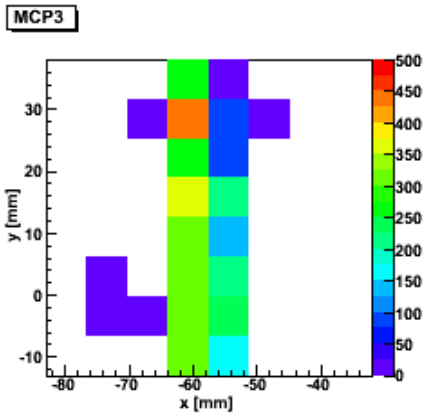


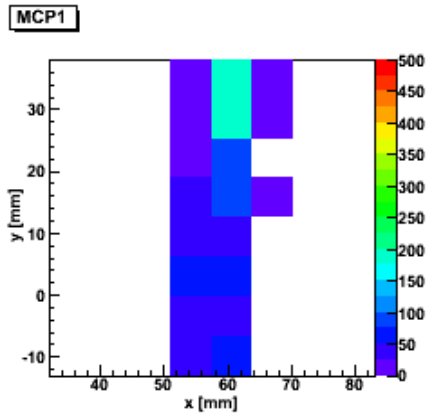
Pixel view

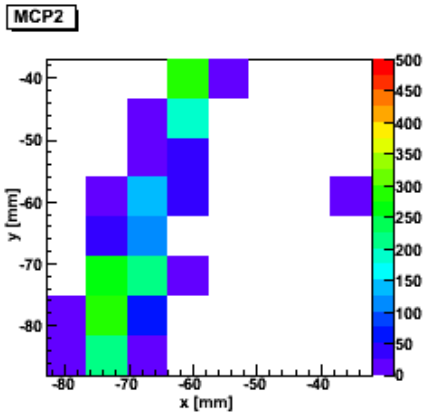
30°





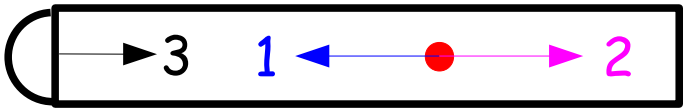




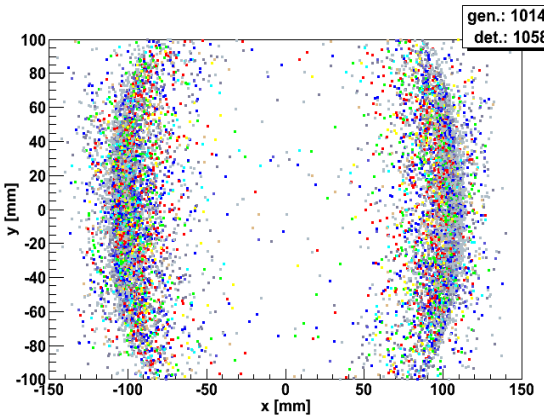


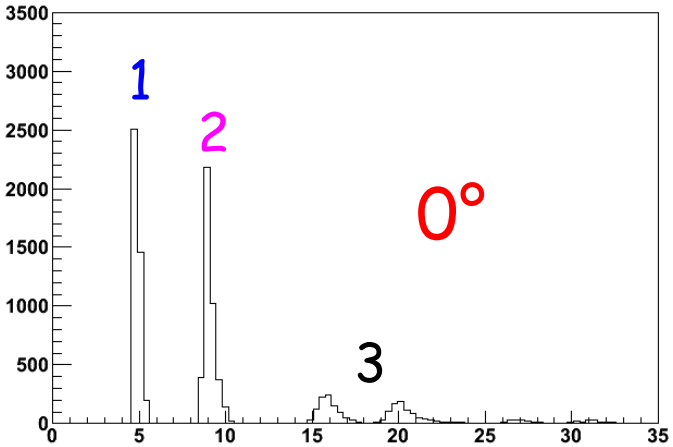
ring width
≈ 2 columns

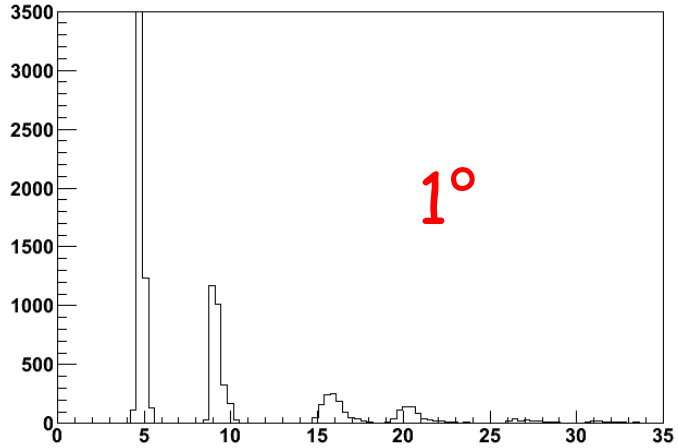
Time information



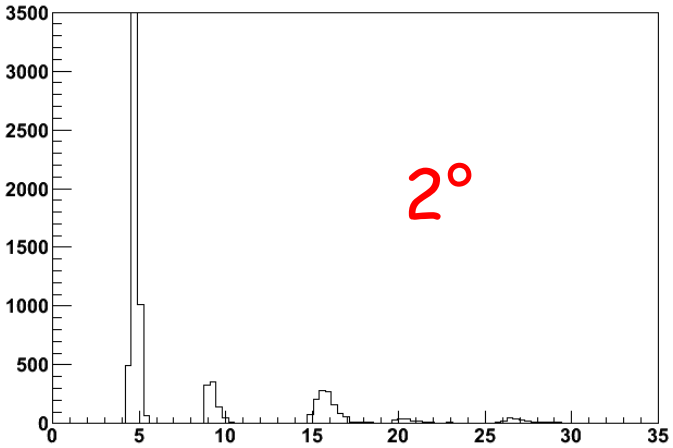
0°

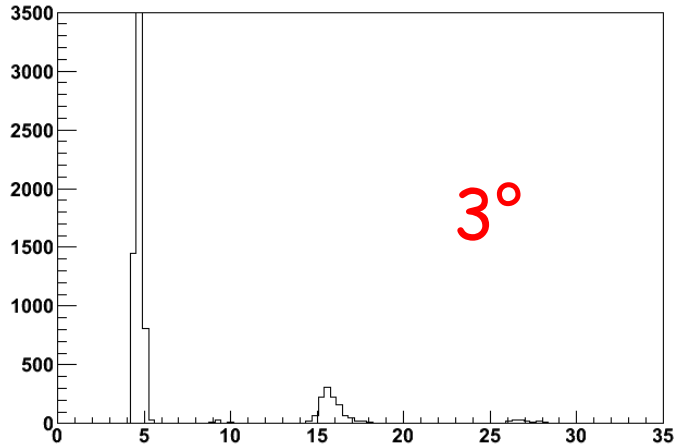






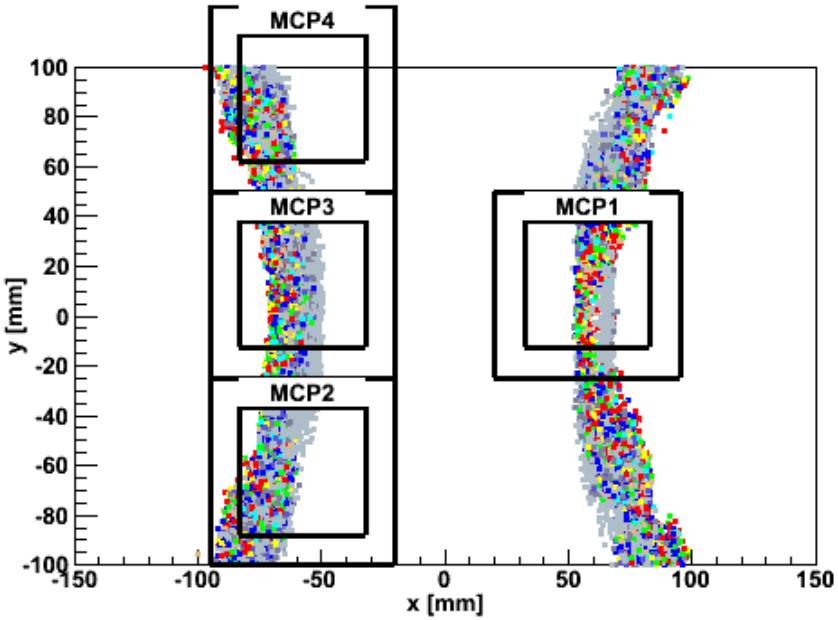
time [ns]

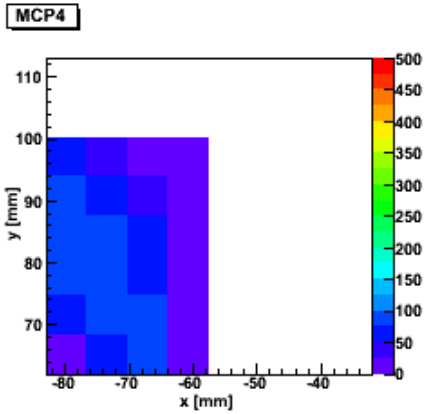




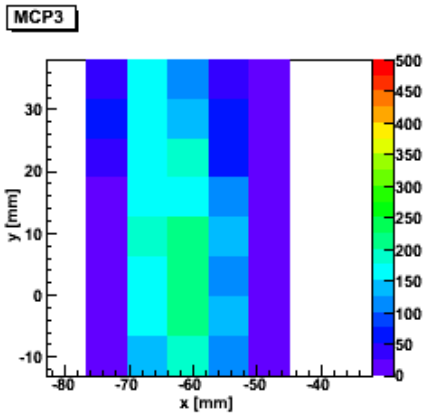
Without lens

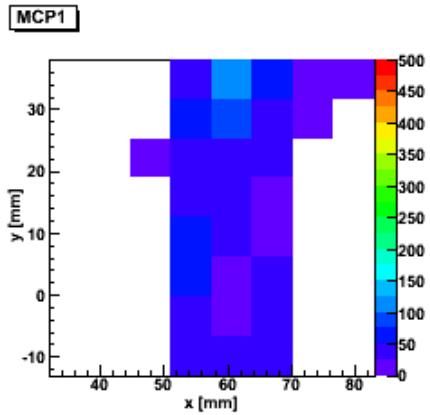
30°

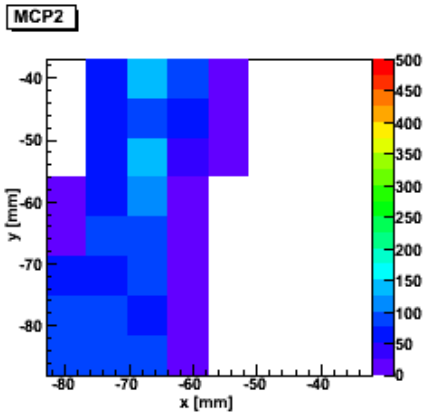




ring width
≈ 3-4 columns



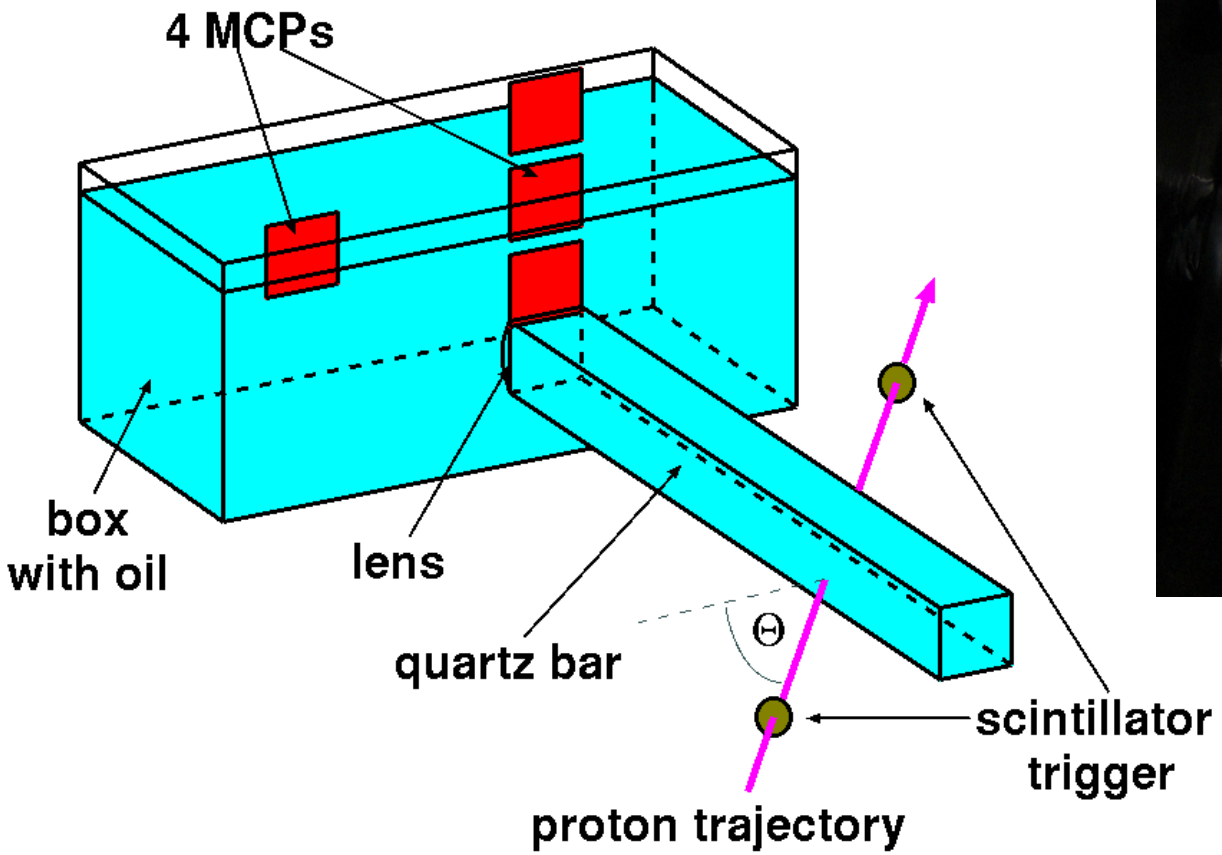


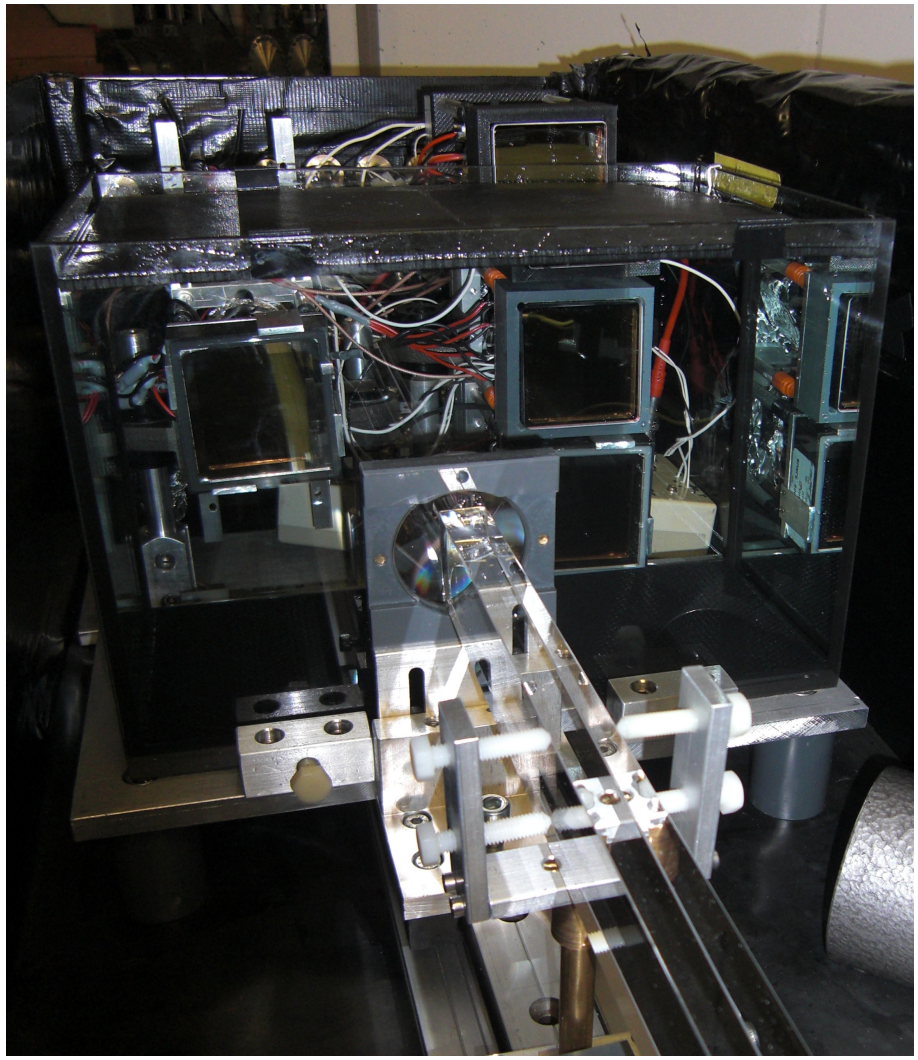


Conclusion

Start conditions:

- fishtank top & bottom are blacked
- incidence angle: 30°
- MCP: 1-3 arrangement





And Jochen will show the reality