# The Status of Micromegas Centarl Tracker

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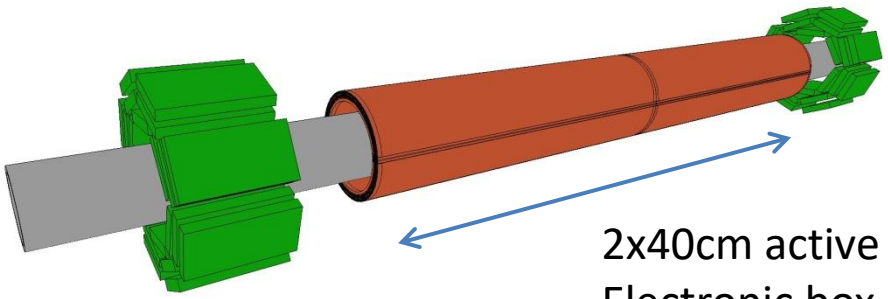
# Status of MCT(1)



2x40cm active area
Electronic box positioned at |Z| =55

- New gas mixture proposed on the basis of R&D and simulation to provide resolution better then 150μ for operation at B=1T
- We have agreement with Minsk group to produce DLC coating; Coating quality and it degradation due to discharges was tested with multiple prototypes
- It was proved experimentally that very dense pillar structure (6% of active area) required for bended detector do not worsen significantly resolution and efficiency
- Simplified half-cylindrical prototype was built and tested

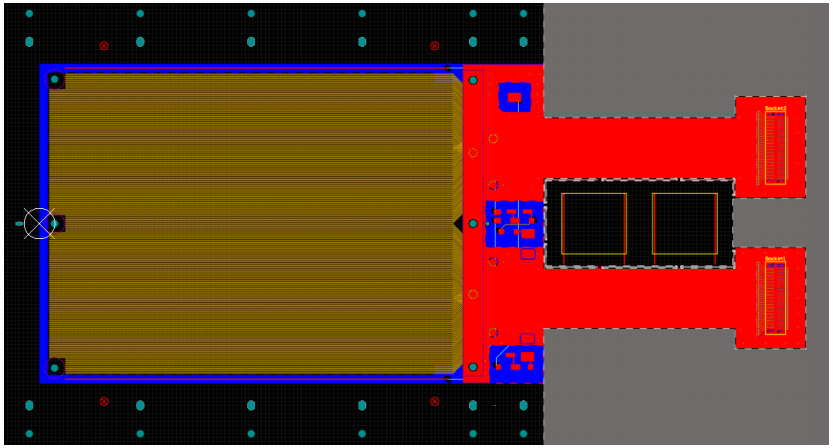
# Realistic prototype

- What does it means : “realistic”
  - Dead areas size, RO strips pitch as well as expected performance are matching final detector design
  - Real materials  and material budget
  - Presence of elements for tracker assembling

- Main component which define “realism”  (RO PCB) are ordered, we expect to have working prototype this summer

# Realistic prototype:  detailes

- Strip pitch increased 0.4mm ->0.6mm.  Number of FE boards reduced from 44 to 32 with good enough resolution

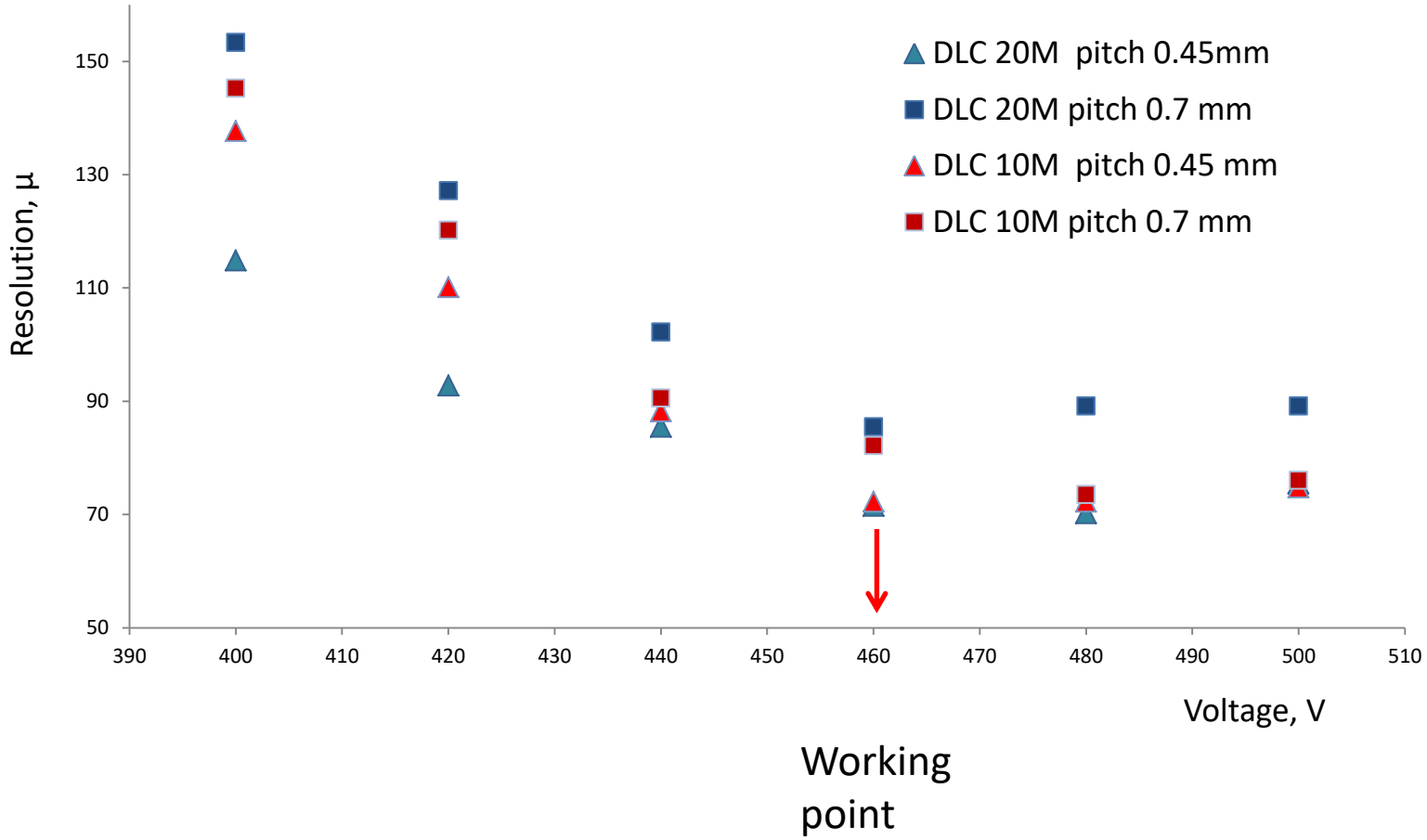


- Material budget for active area: 0.31-0.35% $X_0$ per layer, depending on shielding  variants.

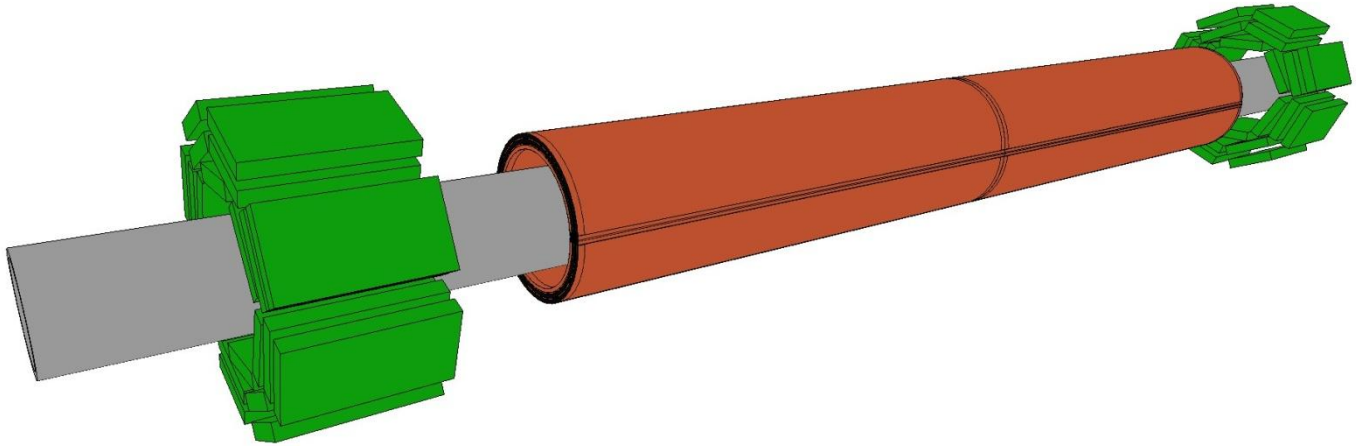
- Detector capacity was estimated. For current design $C \approx 90\ pF$/strip. May be reduced to ~50 pF/srip by the cost of board complexity and additional dedicated shielding layer (+0.05%$X_0$)

# Effect of strip pitch on resolution

## result of July2024 beam test



# MCT : Cooling system



- 12 W/board, 265 W/side expected power consumption+L1
- Power is dissipated in inner volume of Straw Tracker

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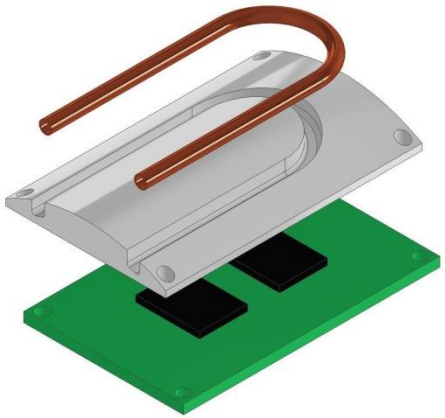
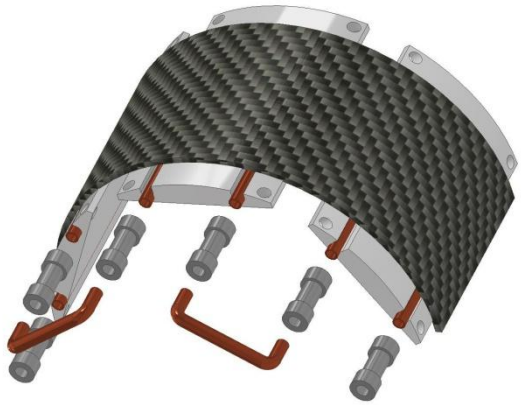
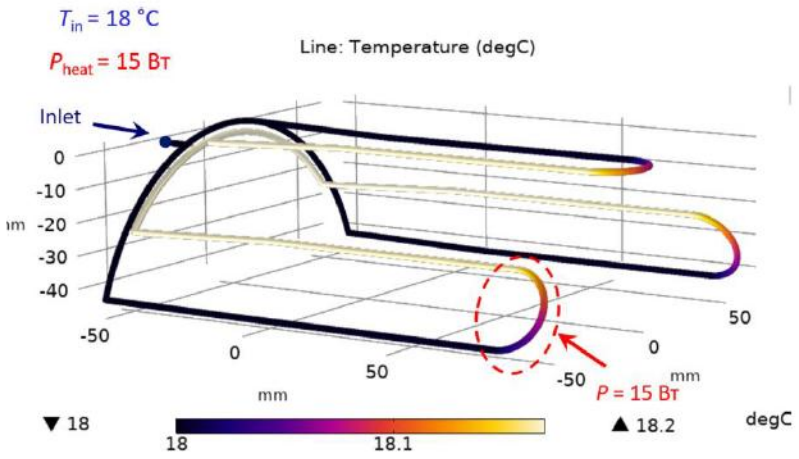
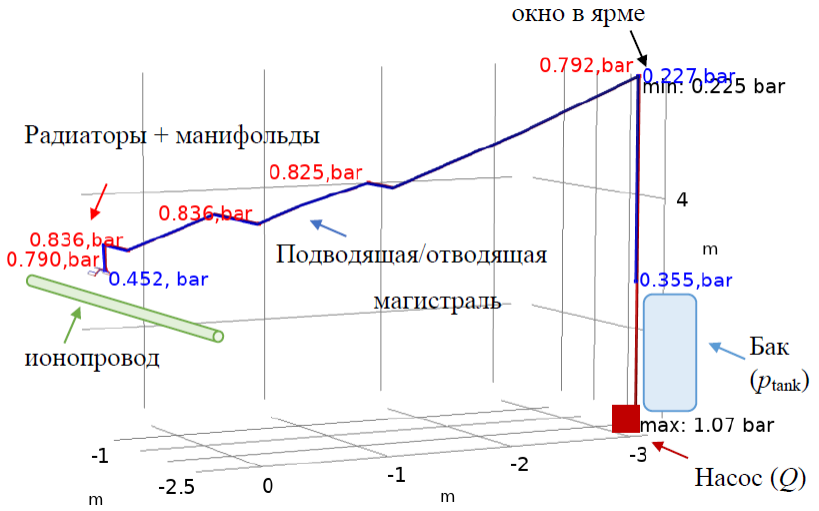




- Requirements:
  - Leakless
  - Pmin>0.15Bar
  - Liquid temperature rising $\Delta T \sim 1^{o} C$
- Calculation of water flow in cooling pipes was done Belarus State University group. Efficiency of thermo-interface ant board temperature is not the subject of calculation
- After first iteration of calculations inner diameter of cooling pipes was increased from 2.5 to 3mm and connection scheme changed to parallel

# MCT Cooling : results




- 3mm cooling pipe, 5mm manifold and 10 mm input/exaust lines are proposed for final variant of system
- $P_{min} > 0.2Bar,\ P_{max} < 0.85Bar$
- $7000 < Re < 9000$ (Re=4000 is limit for laminar flow)
- $\Delta T_{water} = 0.2℃$