PUMA @ ELENA

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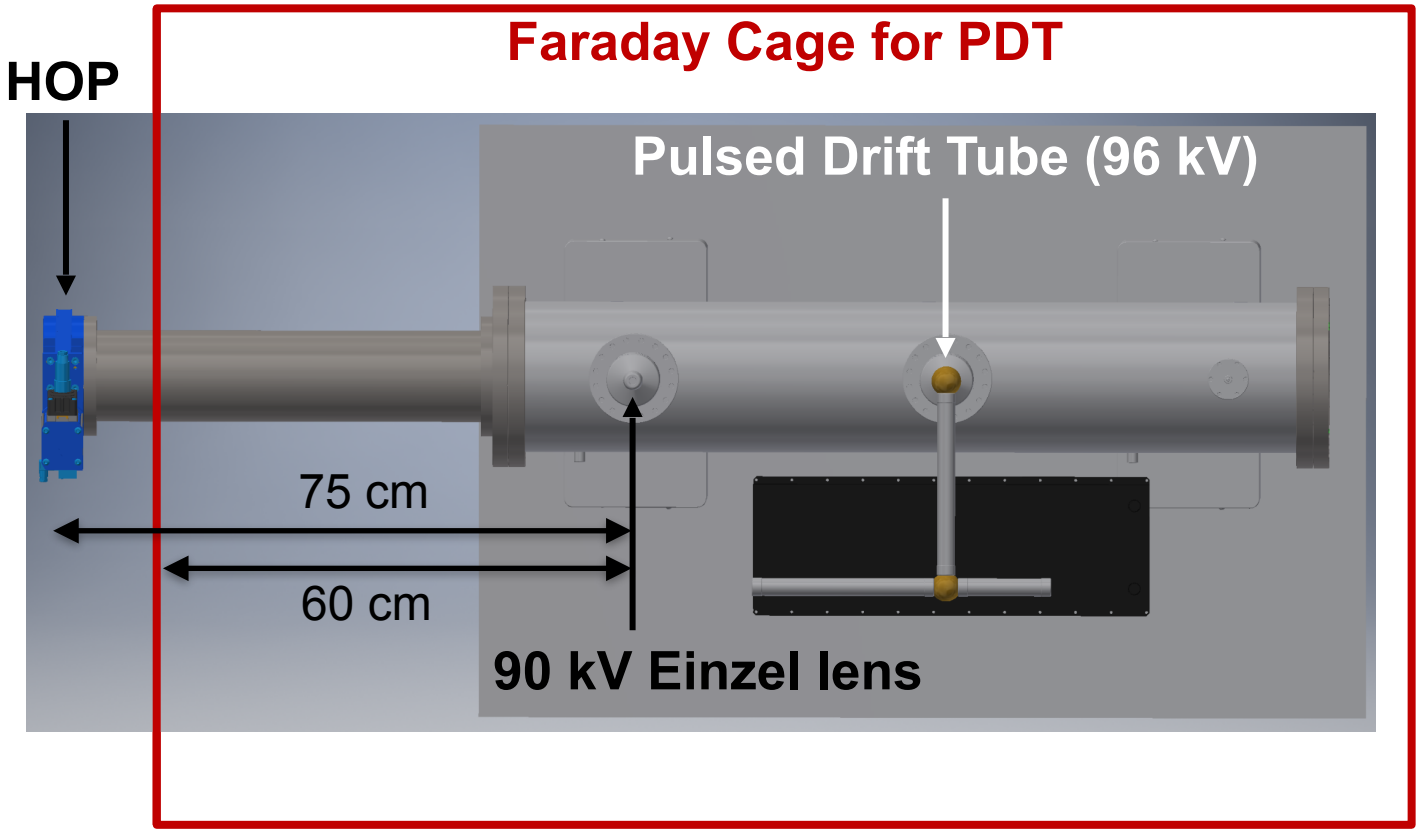
Optics requirements @ ELENA



- For voltages applied in the PDT (~100 kV): **at least 50 cm** between cage wall & electrode
- Presented design: 60 cm safety distance, 75 cm between HOP and focusing point (Einzel lens)

Optics requirements @ ELENA

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- Assumed beam properties at the Einzel lens:
  - Horizontal rms width of **3.3 mm**
  - Vertical rms width of **2.3 mm**
  - Horizontal rms divergence of **0.5 mrad**
  - Vertical rms divergence of **0.5 mrad**

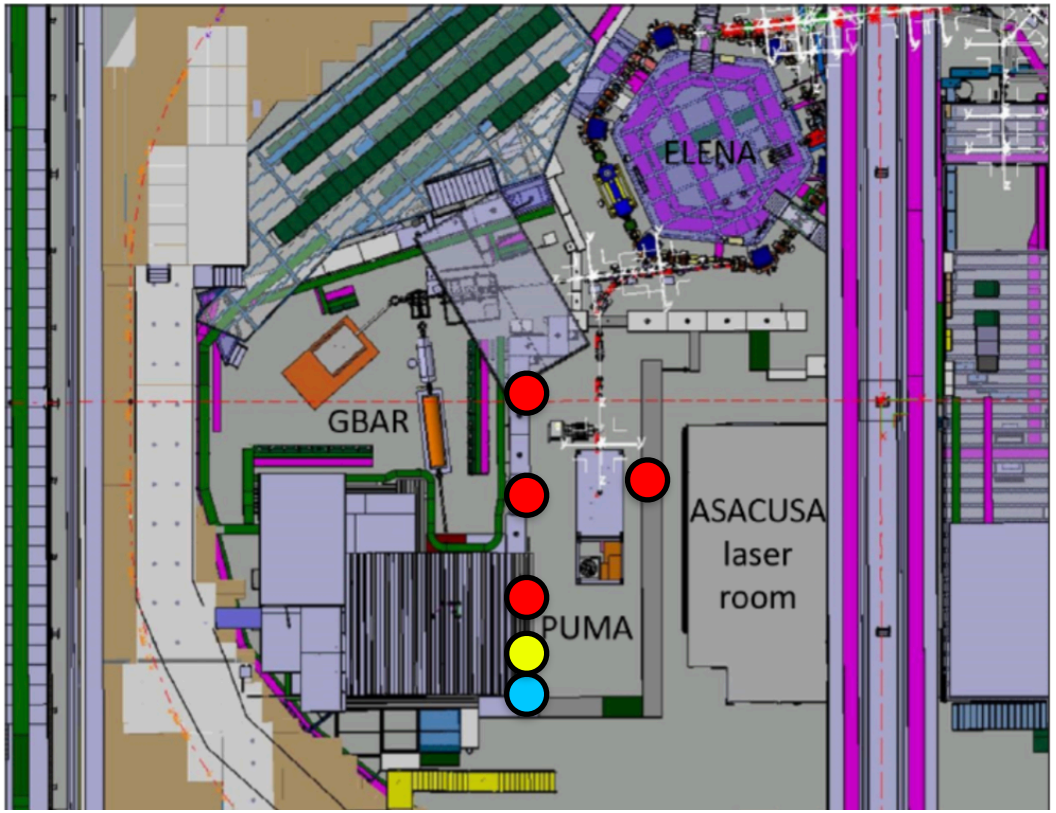
- Preliminary result for transmission into PUMA trap for settings: > 90 %

Question related to optics simulations:

- Interface MADX followed by SIMION simulations, or advantage of full MADX simulation ?
- If MADX, how to implement PDT ?

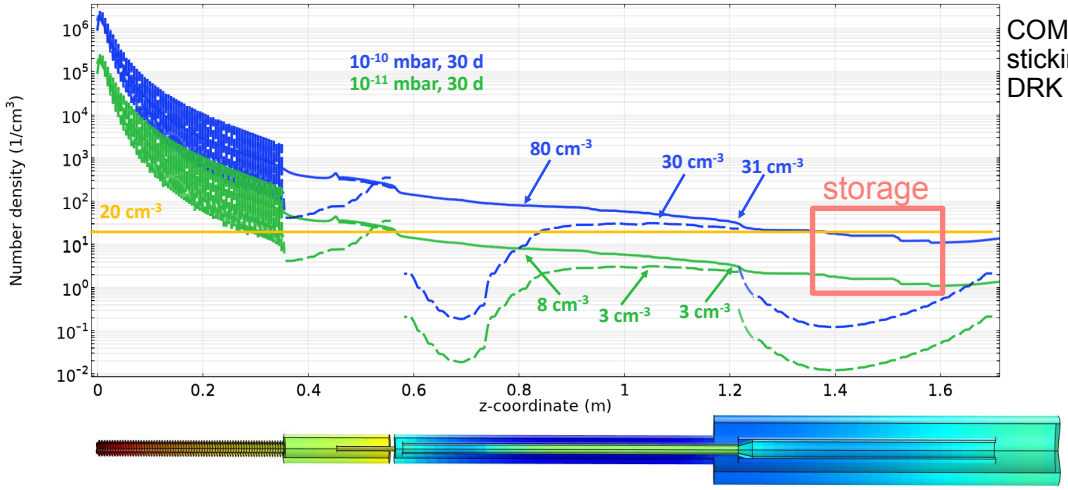
Infrastructure

- 125 A CEE plug (see Bilfinger manual) for main power source (100 kVA)
- Water at ground level: OK
- 4 x 8 sockets 220 V (8A, 1 phase)
- 3 along left wall, 1 right wall
- PDT power requirements as for GBAR (information to be obtained them) *Action TUDA*
- Other power sockets for versatile use?
- Complete list by 25/09/2020 *Action TUDa* + discussion FB
- Total weight evaluated at 9.5 tons *Action TUDa: detail, measured values*

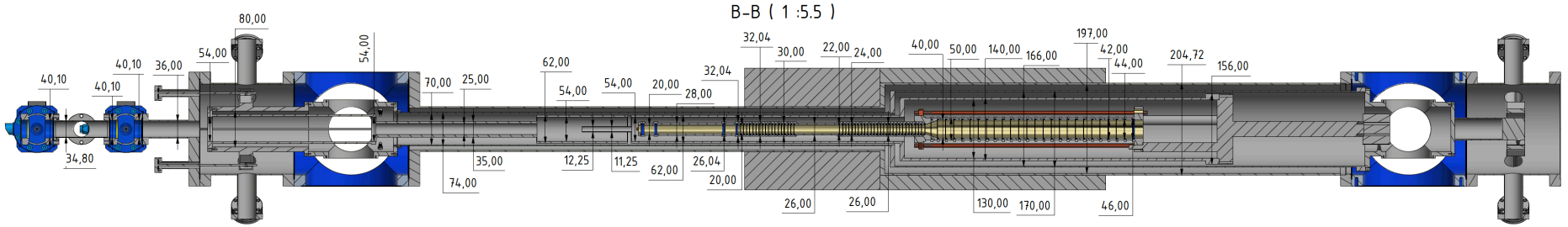


PUMA 4-K cryostat

- Residual gas density < 50 cm^{-3} PUMA allows storage (half-life of antiproton cloud) **longer than 100 days**
- PUMA targets a vacuum of **5 10^{-11} mbar in front of experiment**
- Design of cryostat in progress validated by COMSOL simulations, collaboration CERN TE-VSC

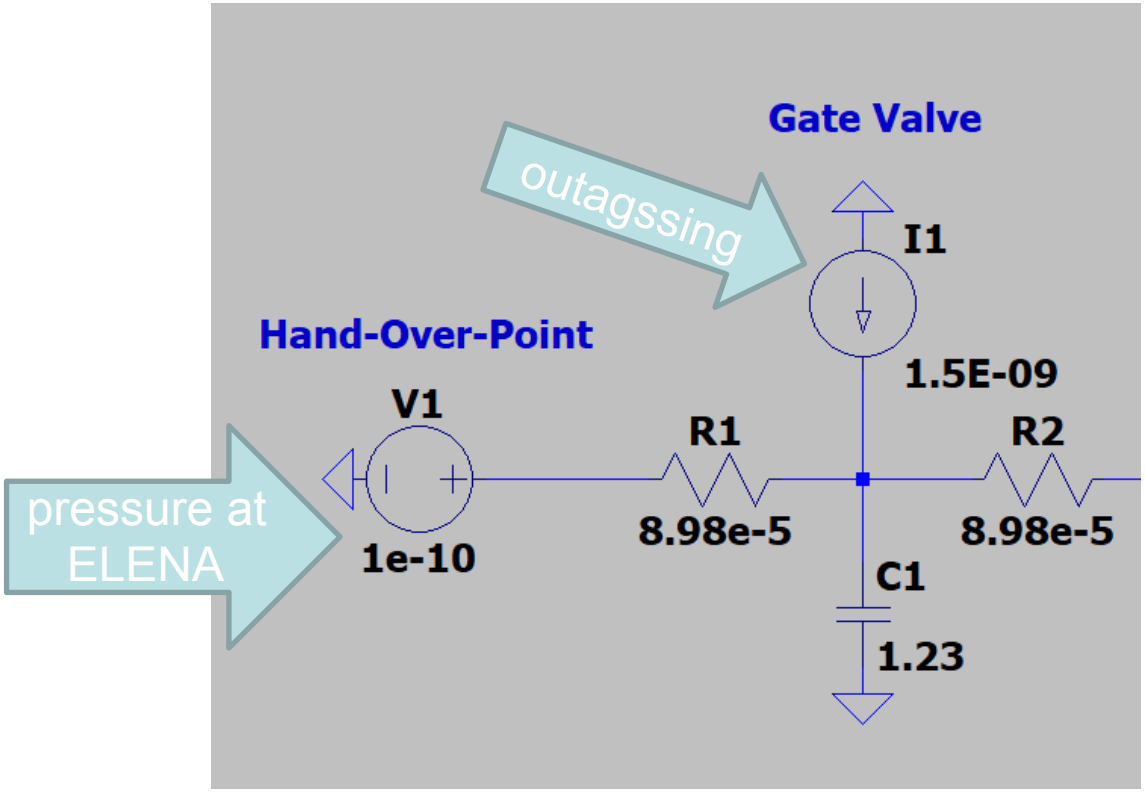


COMSOL simulations
sticking factor 0.3
DRK isotherm extrapolated on data



Vacuum at ELENA

- Electrical Network Analysis (ENA) for a first realistic estimate



outgassing rate
5.33e-12 mbar l/s /cm^2
(CERN values)

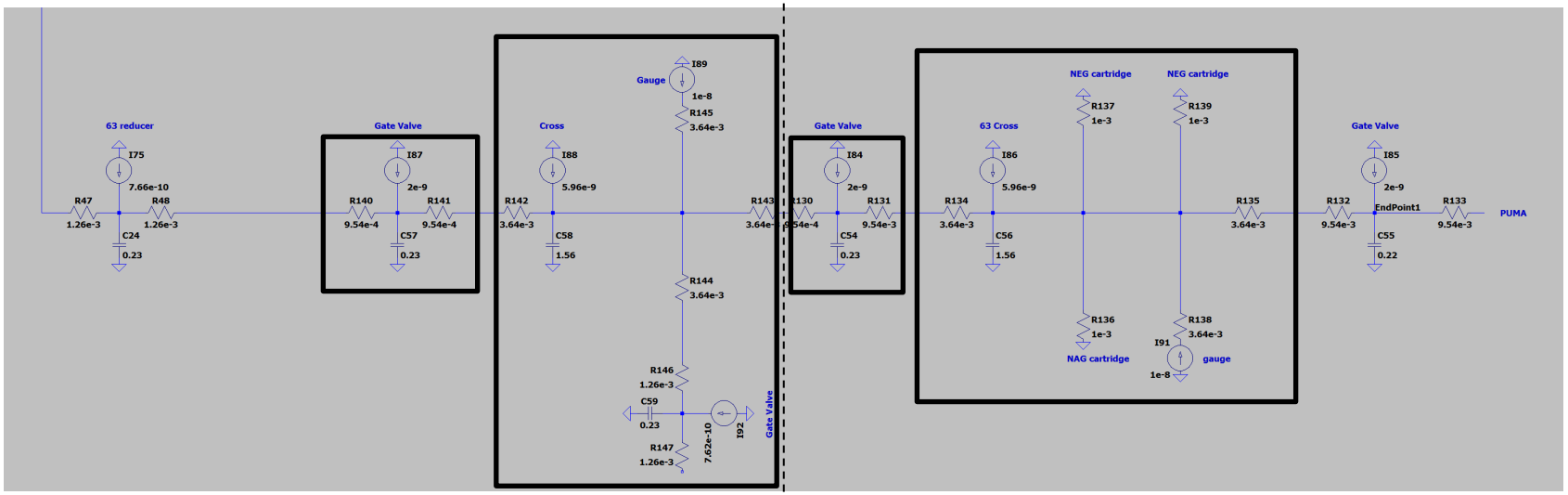
conductance:
C=0.4594*D^3/L
D,L in mm

Vacuum at ELENA

- **4. 10^{-11} mbar** simulated at the entrance of PUMA
- Ion source included in simulation (no strong effect)
- Room for improvement (pumping stations at the PDT, narrower conductance)

Action: TUDA,CERN (José): confirm simulations, get uncertainties (meeting on 9/9/20)

Action: TUDA,CERN (José): same for ISOLDE



DN CF63 components in front of PUMA detach here
3 NEG cartridges a 1000L/s
Outgassing instrumentation assumed 1e-8 mbar L/s