

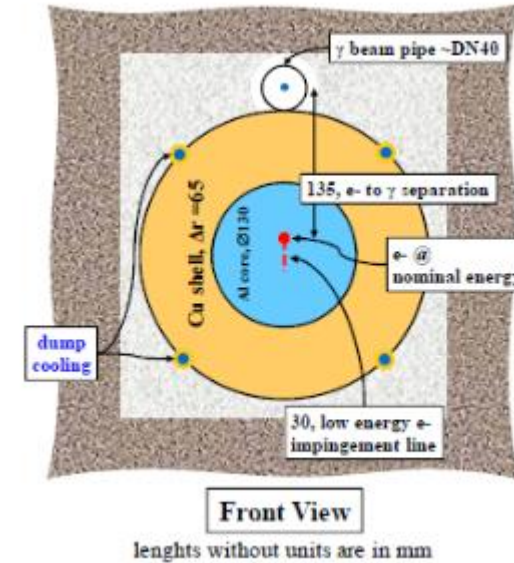
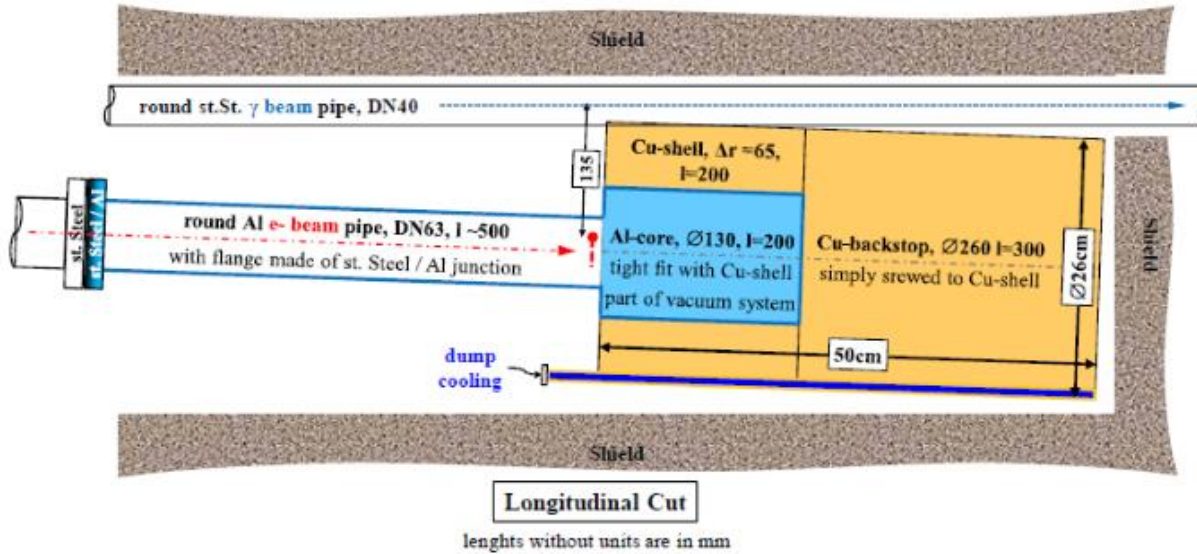
ELBEX Main Dump Line Geometry

Ruth

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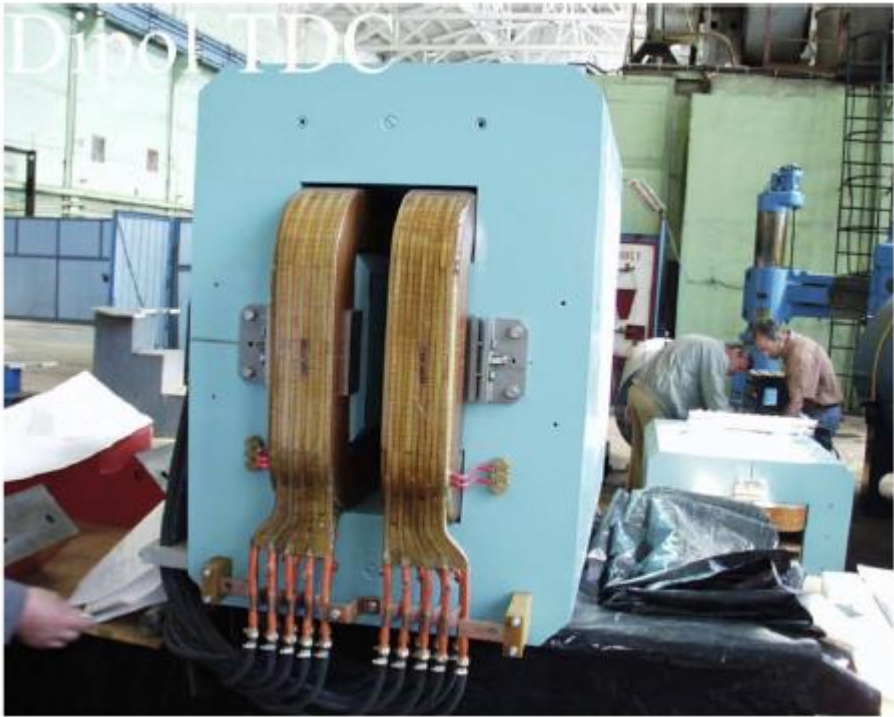
Dump dimensions

- Assume LUXE dump ($d_{\text{dump}}=26\text{cm}$, $l_{\text{dump}}=50\text{ cm}$)
- 40mm beam pipe

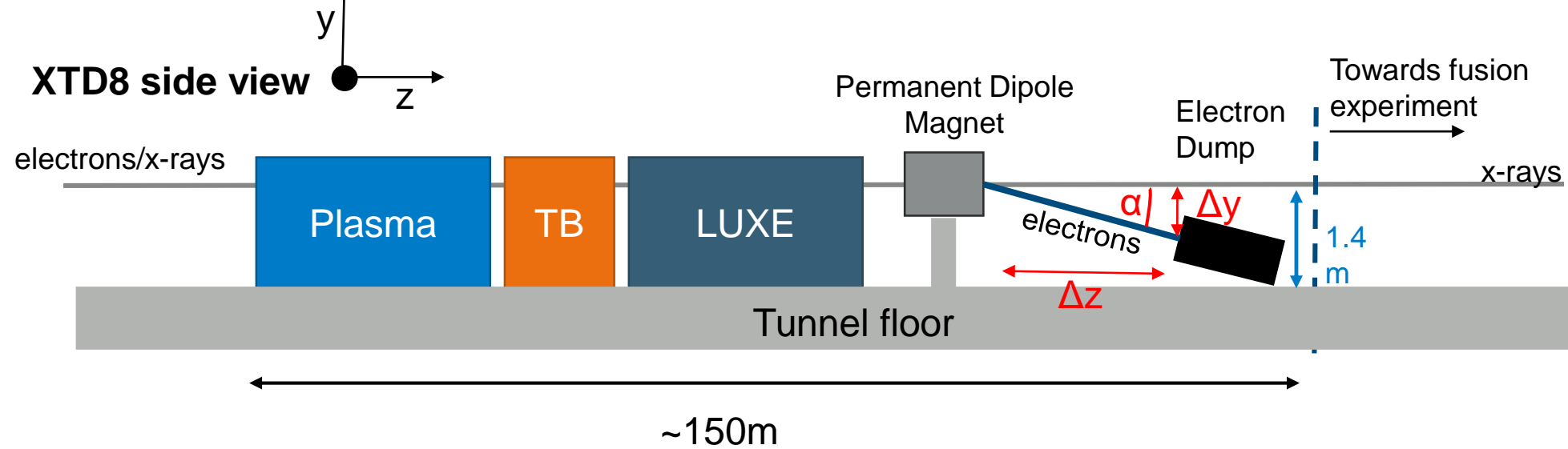


Dipole magnet dimensions

Characteristic	Technical data
Nominal current [A]	372
Max power [kW]	28.1
Resistivity at 20°C [mΩ]	200
Water cooling [l/min]	14.4
Field [T]	1.6
Magnetic height [mm]	60
Magnetic length [mm]	1300
Overall length [mm]	1440
Aperture [mm]	570
Weight [kg]	6000



Spectrometer geometry



- Electrons $E_{\text{max}}=40 \text{ GeV}$, $B=1.6\text{T}$, $l_{\text{dipole}}=1.3\text{m}$, $d_{\text{dump}}=26\text{cm}$, $d_{\text{beampipe}}=40\text{mm}$
- Angle $\alpha = 0.3 B \cdot \frac{l_{\text{dipole}}}{E_{\text{max}}[\text{GeV}]} \approx 0.0156 \text{ rad}$
- Condition for dump to fit underneath beam pipe: $\Delta y \geq \frac{d_{\text{dump}}}{2} \cos \alpha + \frac{d_{\text{beampipe}}}{2}$
- Spectrometer geometry: $\Delta y = \Delta z \cdot \tan \alpha$
- Minimal distance required between TDC dipole and dump: $\Delta z \approx 9.6\text{m}$

Dump pedestal

- Dump needs to be lifted up (in position rotated by angle α) to fit just underneath beam pipe
- How high should the pedestal be?
- Condition: $\Delta y_{\text{corners}} + \Delta y_{\text{ped}} + \frac{d_{\text{beam pipe}}}{2} = 1.4\text{m}$
- Roated dump: $\Delta y_{\text{corners}} = l_{\text{dump}} \cdot \sin \alpha + d_{\text{dump}} \cdot \cos \alpha \approx 267\text{mm}$
- Pedestal: $\Delta y_{\text{ped}} = 1.13\text{m}$

