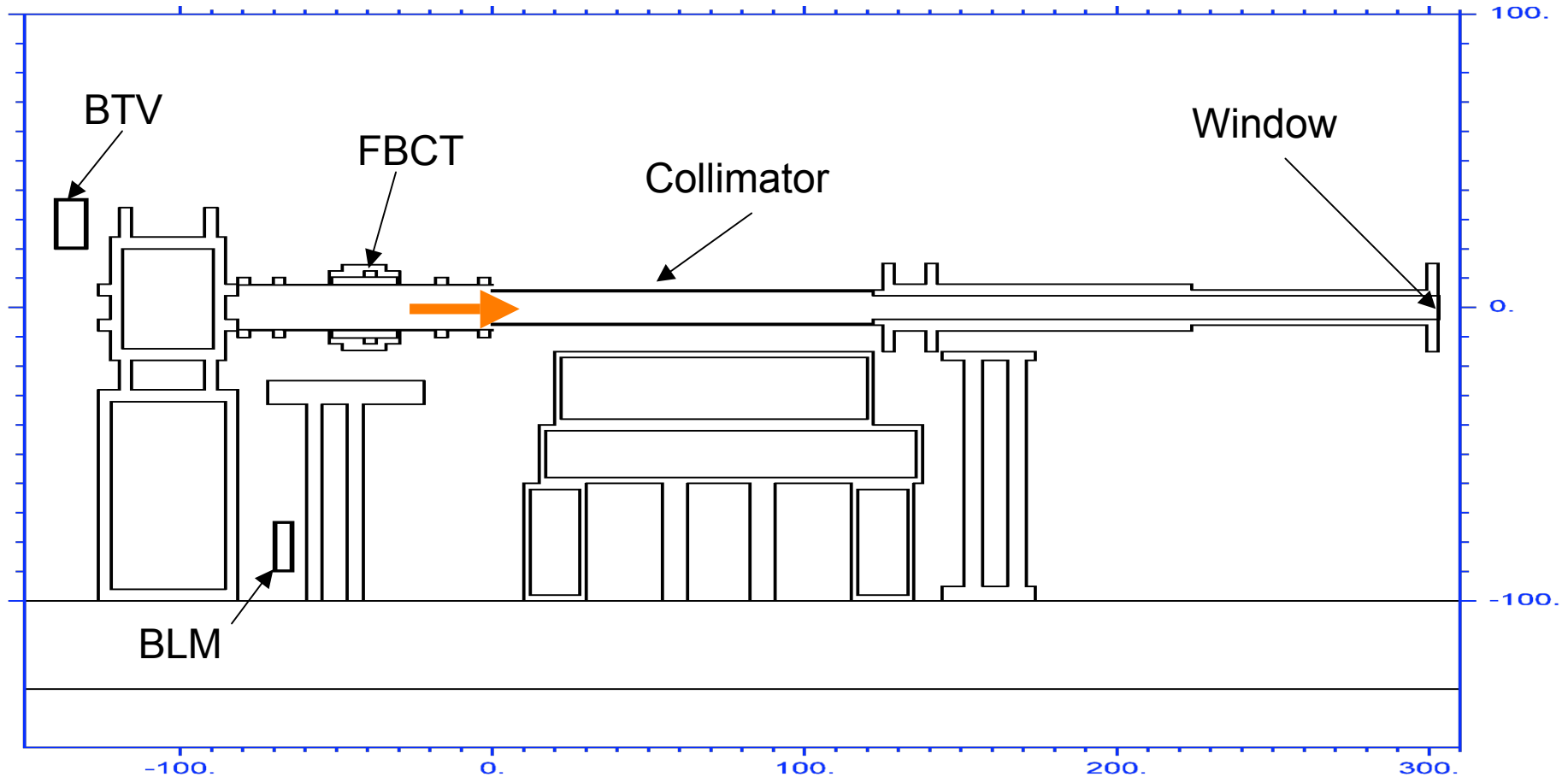


Radiation issues for the LHC collimator test in TT40

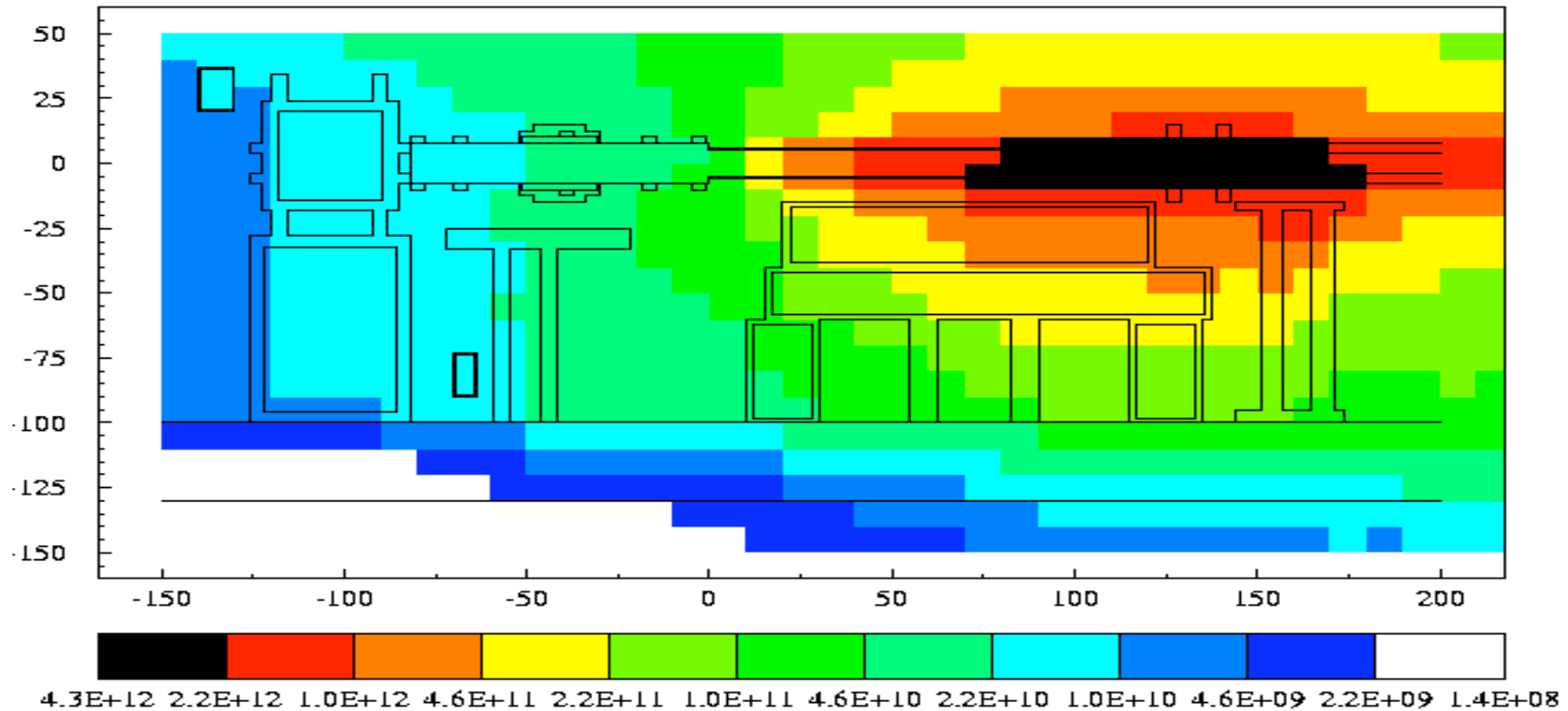
M. Magistris and M. Silari

FLUKA geometry of the test zone



450 GeV proton beam, Gaussian profile (1 mm sigma)

1 MeV neutron equivalent fluence (cm^{-2})

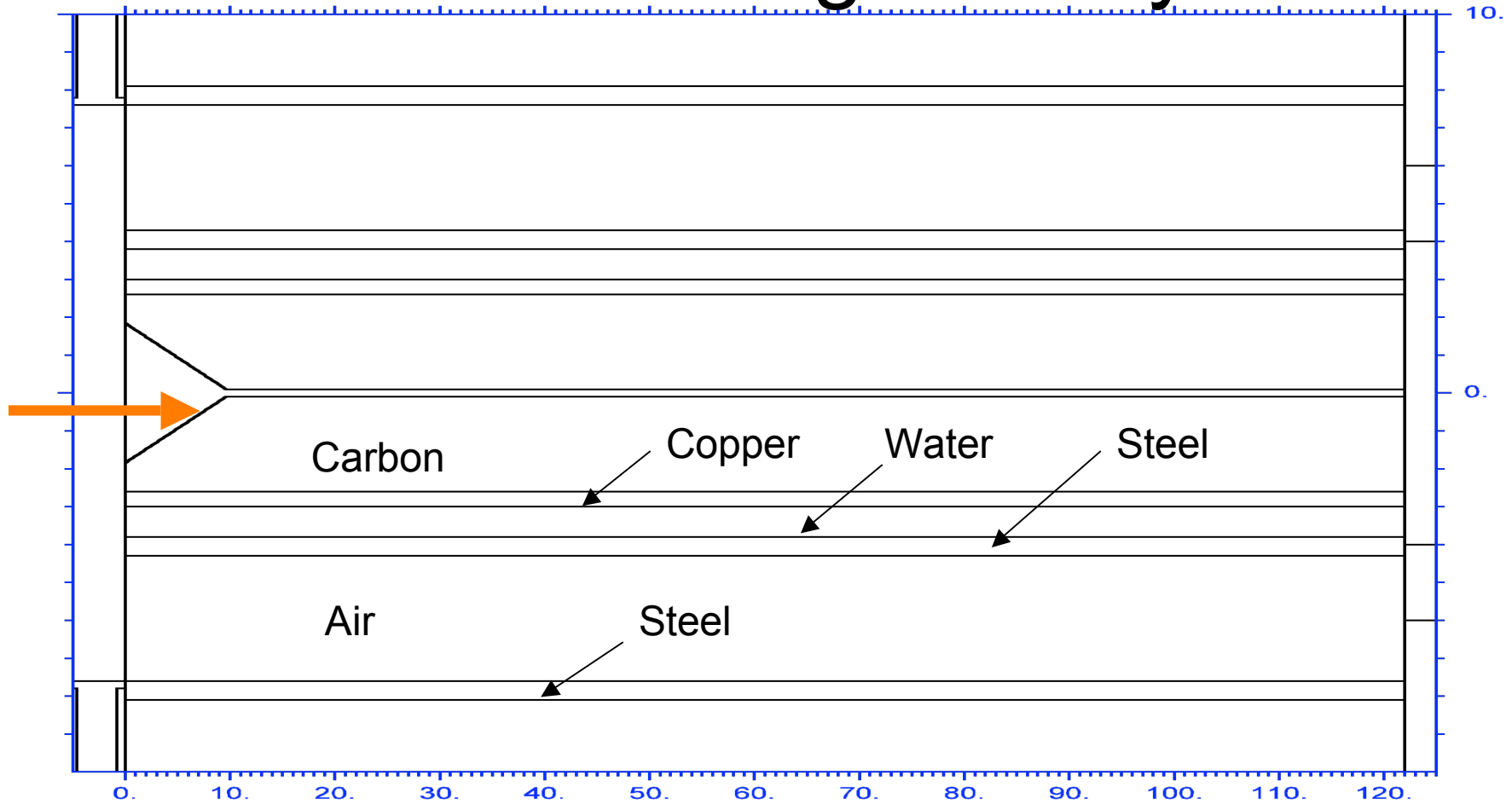


4 * 72 bunches, 1.1×10^{11} protons per bunch.

Contribution from neutrons only.

(Green: $\sim 10^{11}$, Light blue: $\sim 10^{10}$, Dark blue: $\sim 5 \times 10^9$)

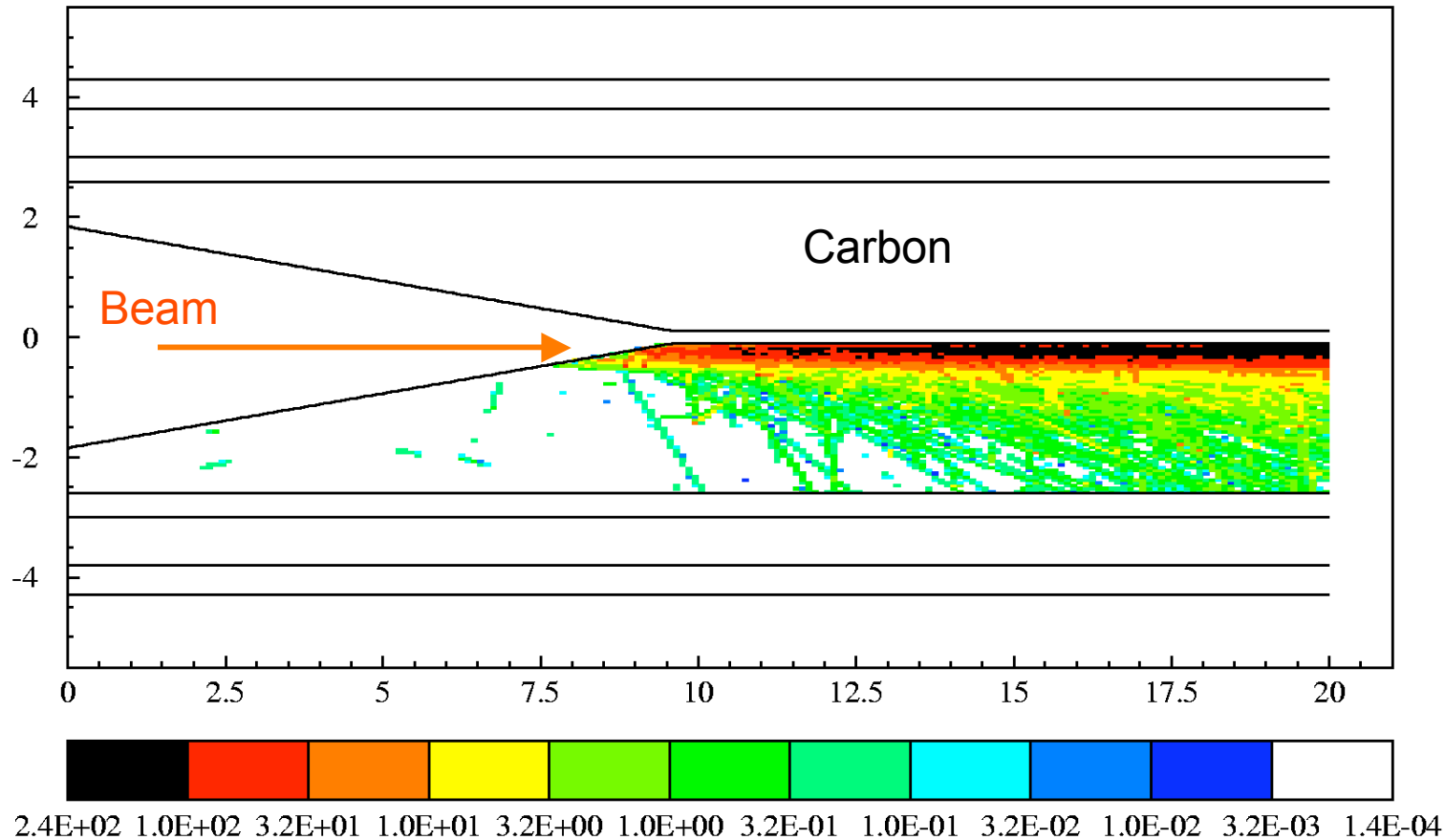
Collimator geometry



Cross sectional view, scales are in cm

(Geometry defined by Vasilis Vlachoudis)

Energy deposited in the collimator (J/g)



(Black region: ~ 250 J/g)

4 * 72 bunches, 1.1×10^{11} protons per bunch.

Proton beam: 0.1 cm sigma.

Energy deposited in the window

- Carbon layer:

diameter: 8 cm, thickness: 2 mm, density: 1.5 g cm^{-3}

$10\text{-}100 \text{ J g}^{-1}$

- AlTi layer: (Ti 50.5%, Al 45.5%, Nb 2% and Cr 2%)

diameter: 8 cm, thickness: 0.1 mm, density: 3.75 g cm^{-3}

$10\text{-}100 \text{ J g}^{-1}$

(The highest energy deposition is expected around the beam axis)

4 * 72 bunches, $1.1 \cdot 10^{11}$ protons per bunch

Proton beam: 0.1 cm sigma.

Dose rate estimation

- 4 * 72 bunches, $1.1 \cdot 10^{11}$ protons per bunch
- Instantaneous irradiation, one metre distance

(μ Sv/h)	1 h Waiting	1 day Waiting	1 week waiting
Steel pipe	500	25	10
Collimator	650	7	2

- Important contribution from the concrete wall
- Access to the area during the first days should be carefully planned