Requirements for design studies

The complete filling for Z running => Requirement ~2.75 × 10^{10} e^+/bunch (4.4 nC) at the linac end or 5.4 nC accepted in the DR

50% losses for injection in the DR (assumed) + 20% additional losses from target up to the end of the e+ linac (assumed)

$$N_{e^-}/\text{bunch} \times \eta^{e+}_{Accepted} \geq 5.4\ \text{nC/bunch} \times 2.5$$

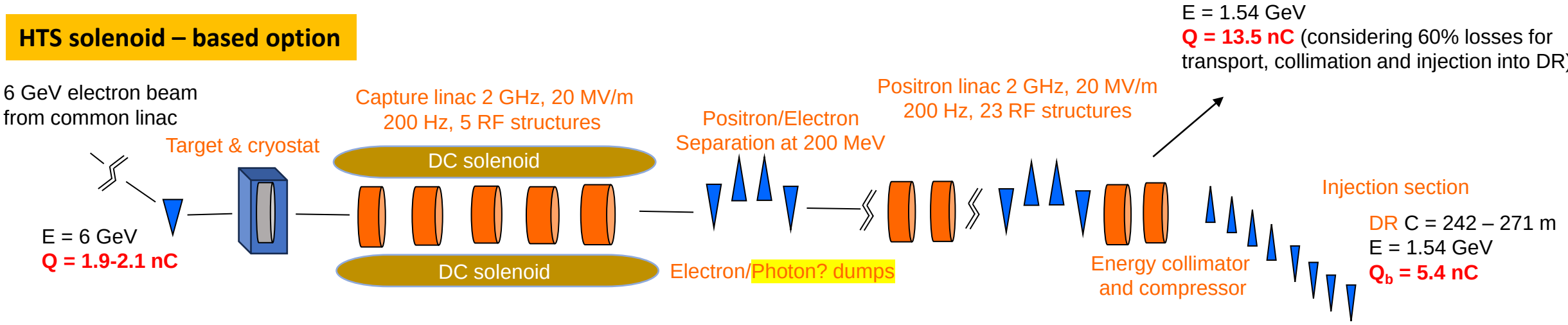
$$\eta^{e^+}_{\text{Accepted}} = \frac{N^{e^+}_{\text{DR accepted}}}{N^{e^-}_{\text{Primary}}}$$

**A safety margin of 2.5 is currently applied for the whole studies (60% losses for transport, collimation and injection into the DR).*

- 20% additional losses from target up to the end of the e+ linac
  - e+ linac simulations (including chicane) will provide more realistic estimation of the accepted yield
  - Include the ESC in the linac start-to-end simulations
  - Still a reasonable safety margin
- 50% losses for injection in the DR
  - To be discussed/fixed with the WP4 (studies including ESC from 2023 => DR acceptance ~ 80%)

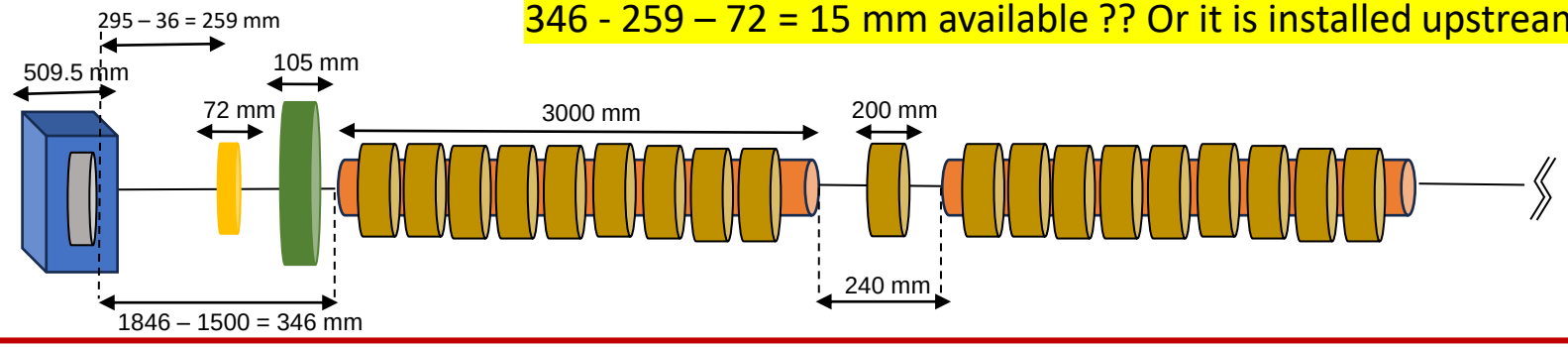
Positron source physics design (current baseline)

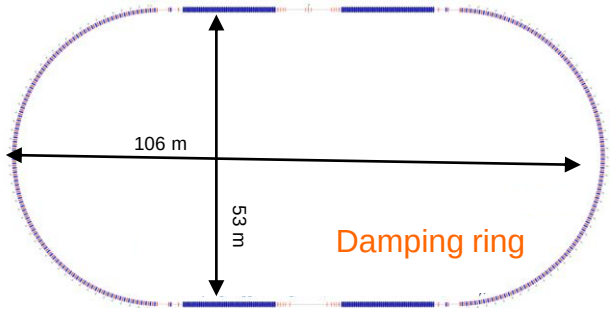
HTS solenoid – based option



Capture system -version 1

Does FLUKA model include short "tuning" solenoid?
346 - 259 – 72 = 15 mm available ?? Or it is installed upstream?





Positron production: conventional scheme (e- beam size on target = 1 mm rms). Target exit located at 40 mm w.r.t. peak field.
Matching Device is based on the SC solenoid (5 HTS coils, 72 mm bore including shielding)
Capture Linac is based on the L-band TW RF structures (2 GHz, 60 mm, 3-m long)
NC long solenoid B = 0.5 T (realistic conventional design based on the short coils B = 0.31 T) + short "tuning" solenoid B = 0.124 T before the 1st RF structure
Shielding made of W before the 1st RF structure (position tbc)