Positron collection system

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Andriy's layout

- Target: 4 mm
- Solenoid 1 : B = 2 T, L=30 cm
- Solenoid 2 : B = 0.5 T, L = 15.44 m
- RF Cavities : f = 1497 MHz, L=15.44 m

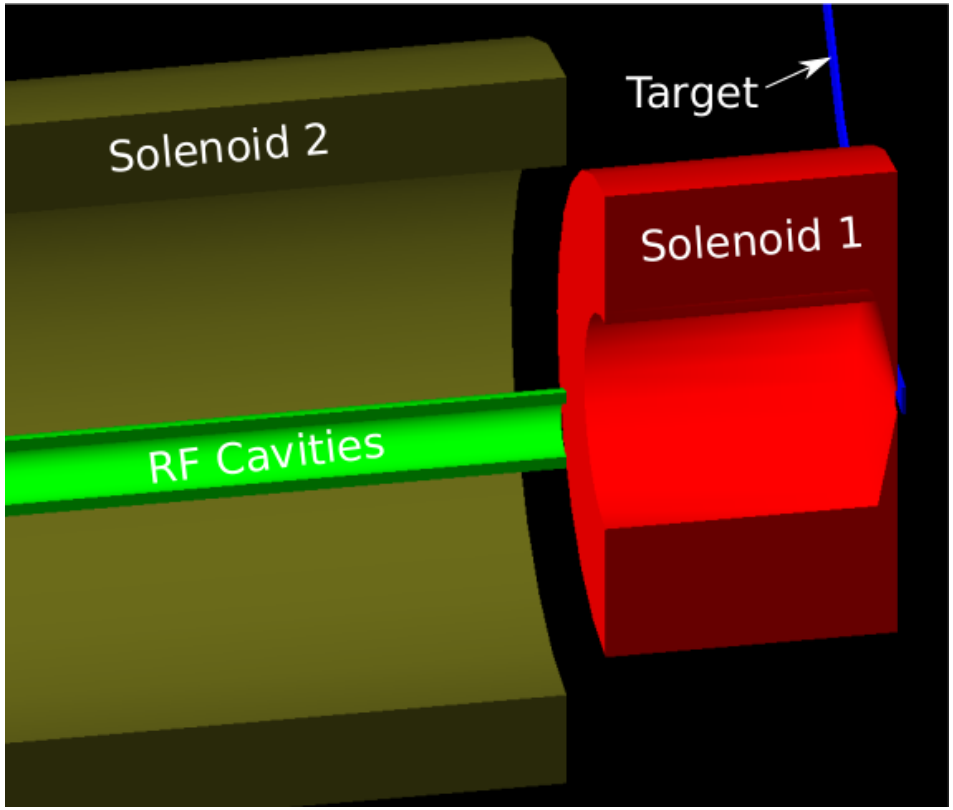
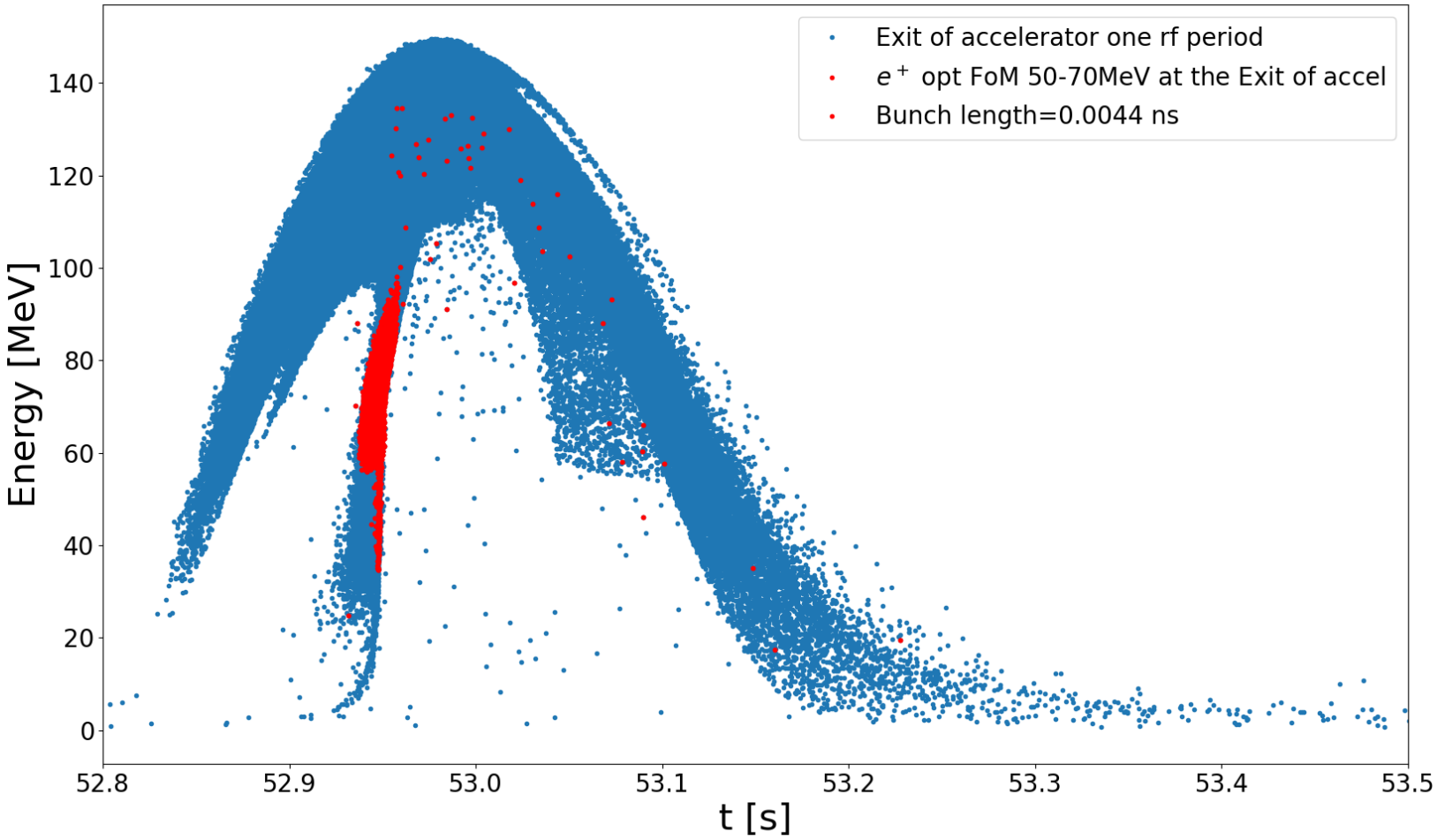


Figure: Target and QWT Geometry.

Longitudinal positron phase space



Longitudinal positron phase space in ELEGANT

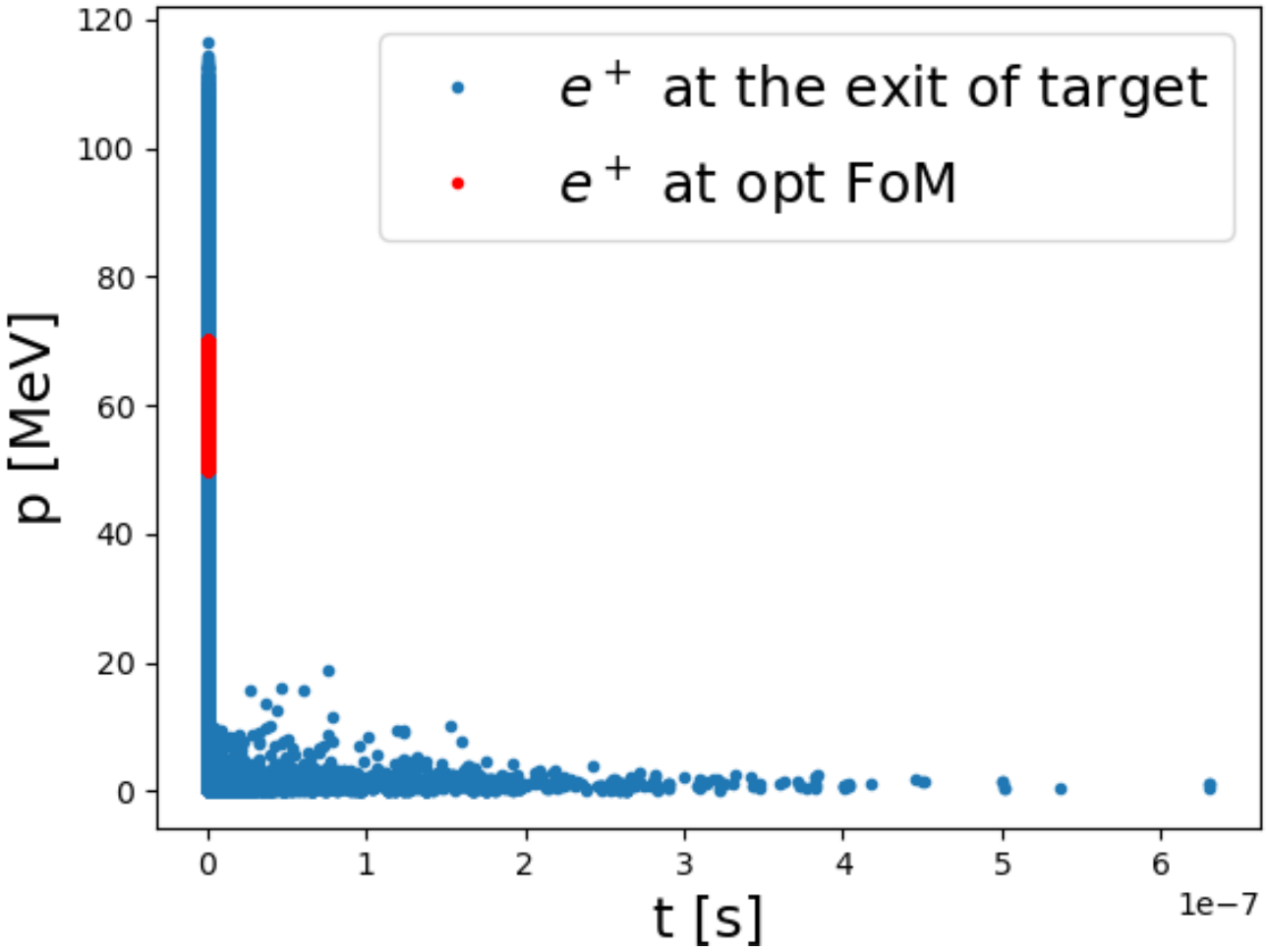
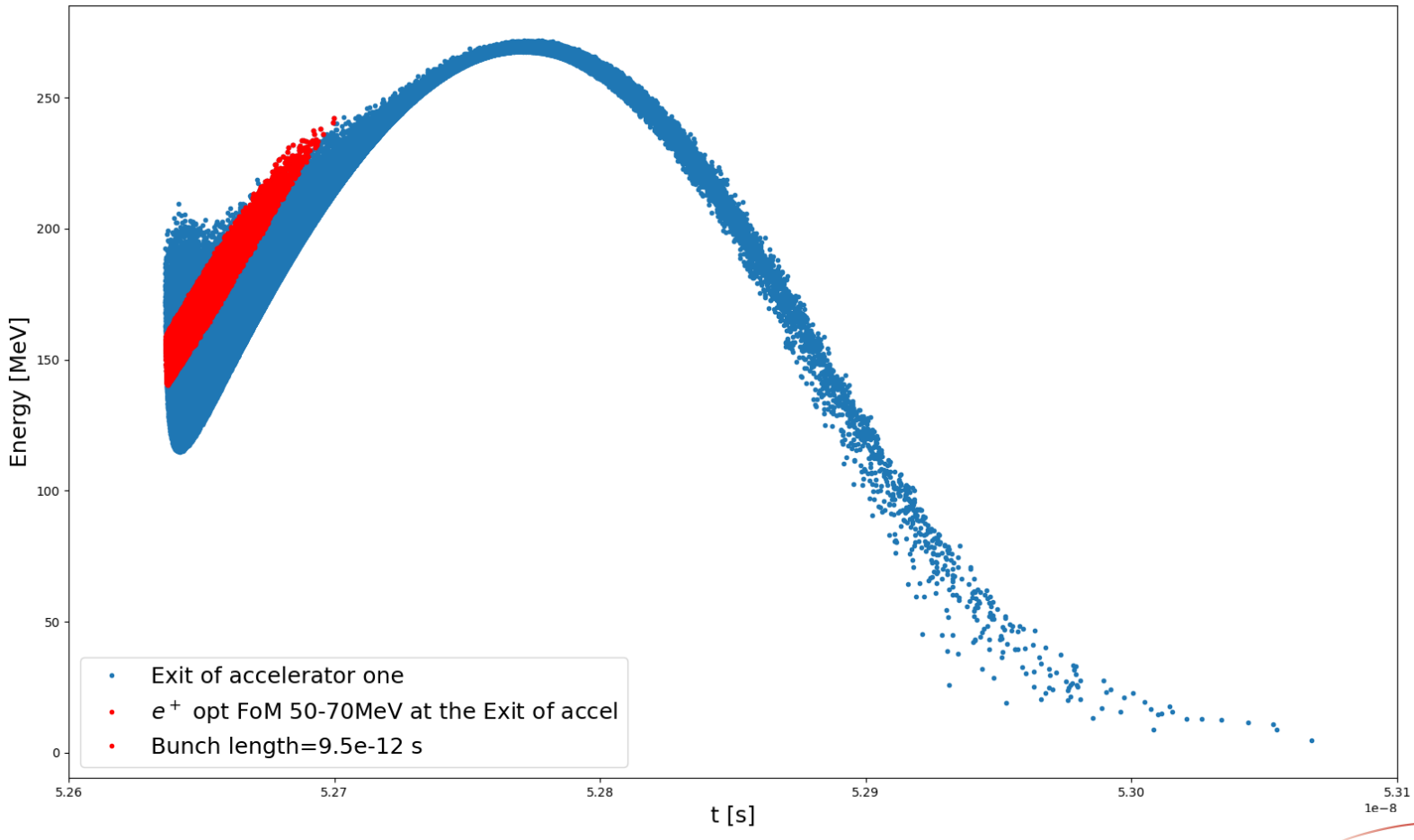
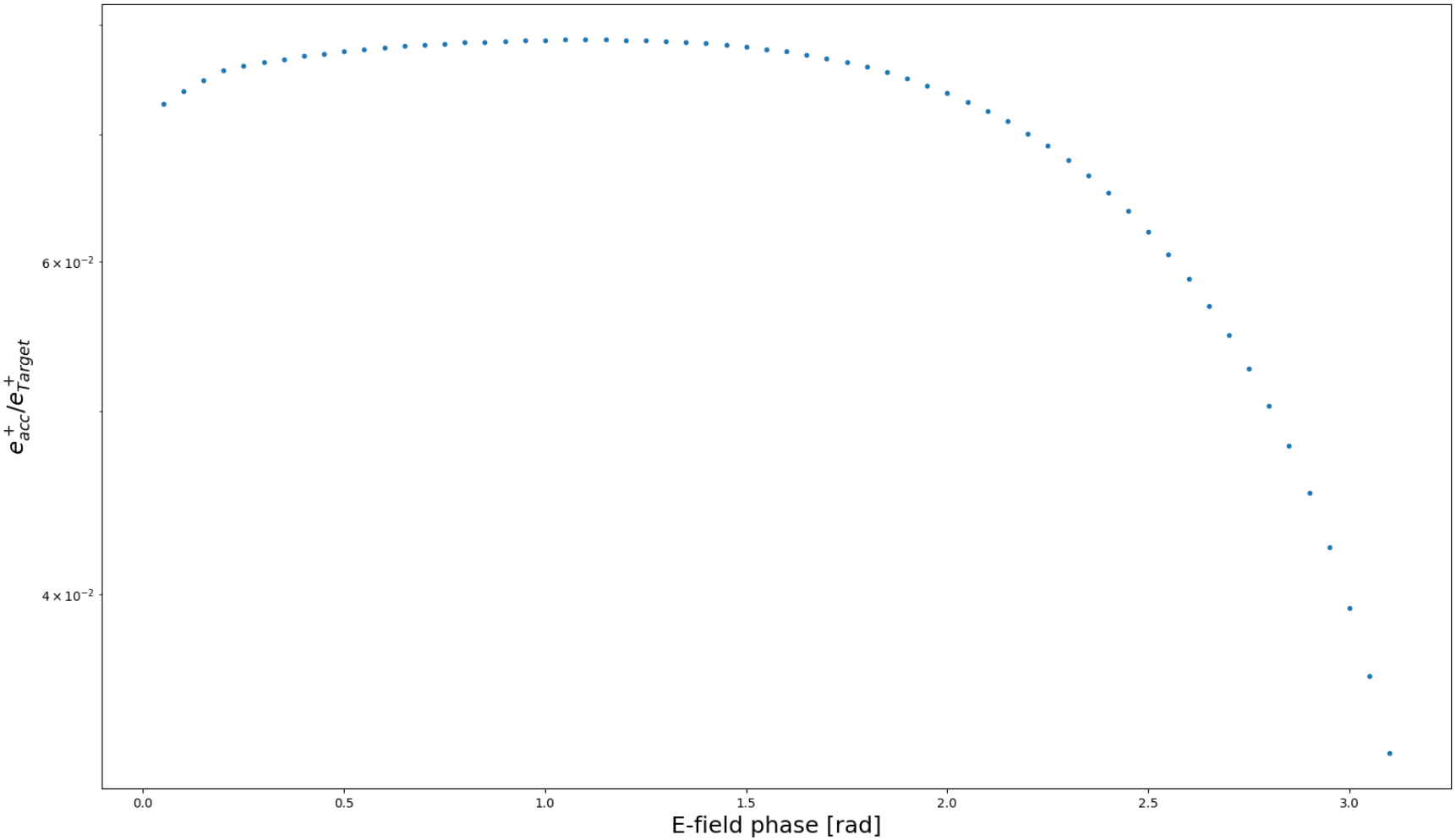


Figure: Positron distribution at the exit of Andriy's target

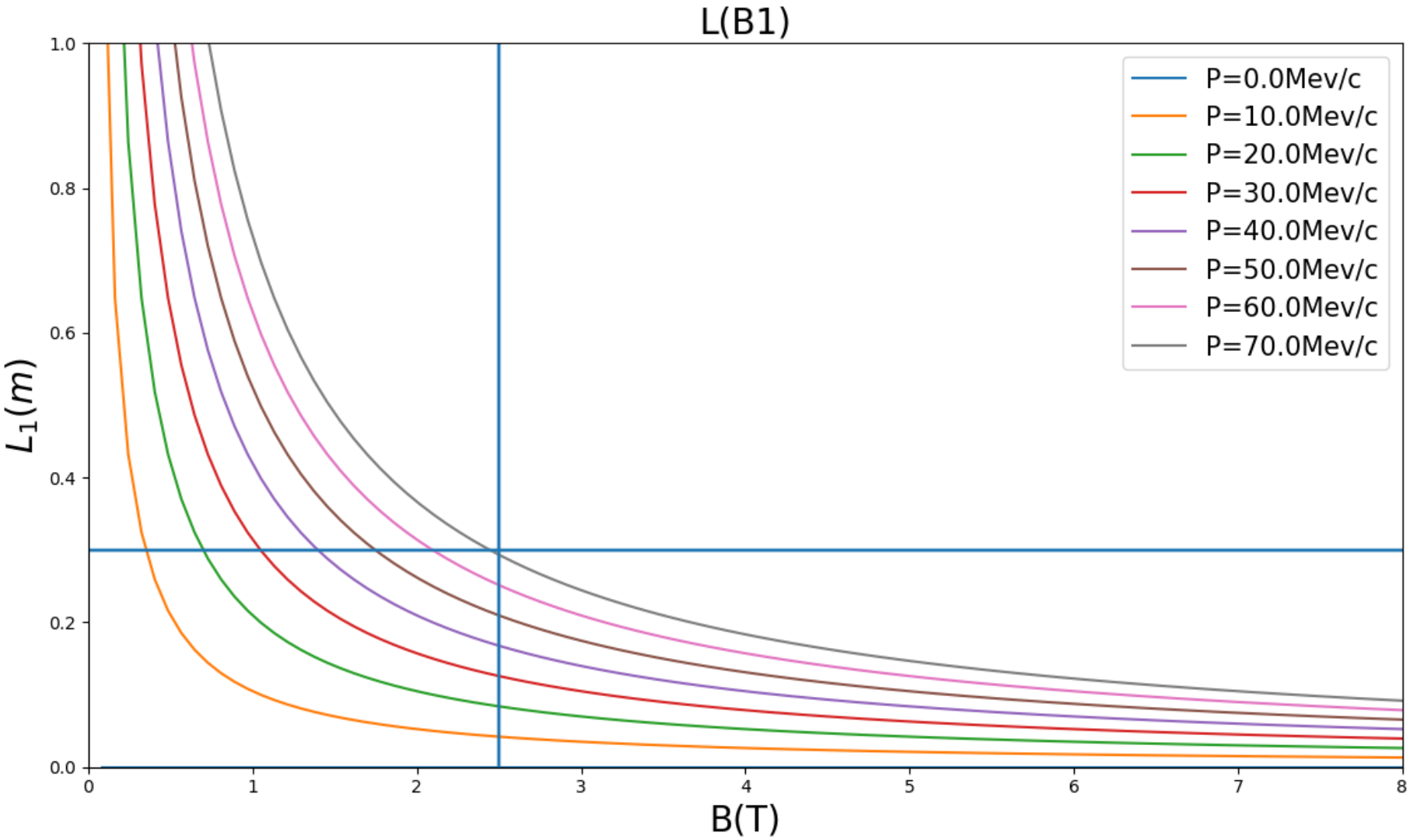
Longitudinal positron phase space in ELEGANT **At the exit of accelerator**



Optimum E field phase

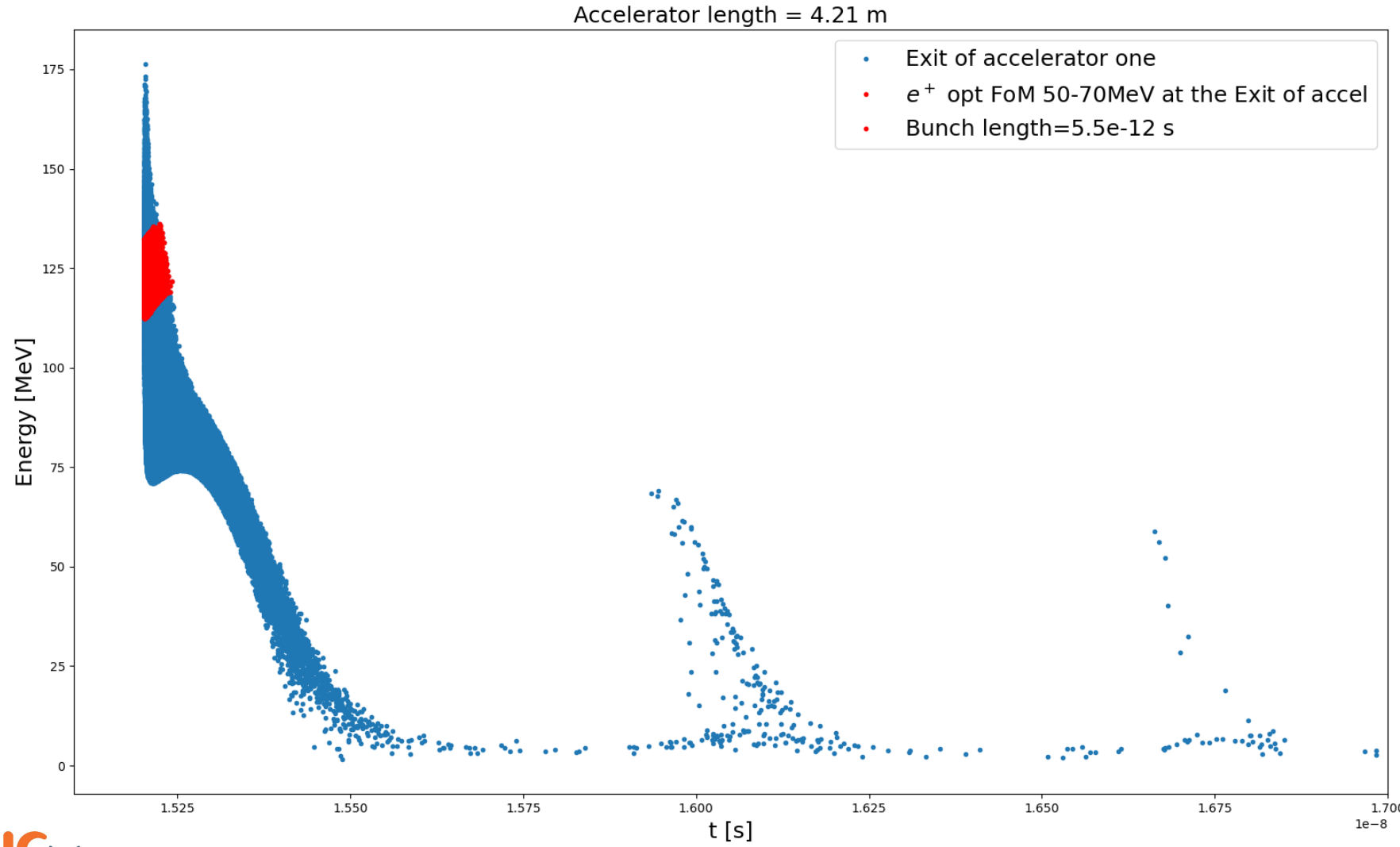


Optimum QWT length



variation of the length L_1 of the short lens versus the magnetic field B_1 for several positron energies.

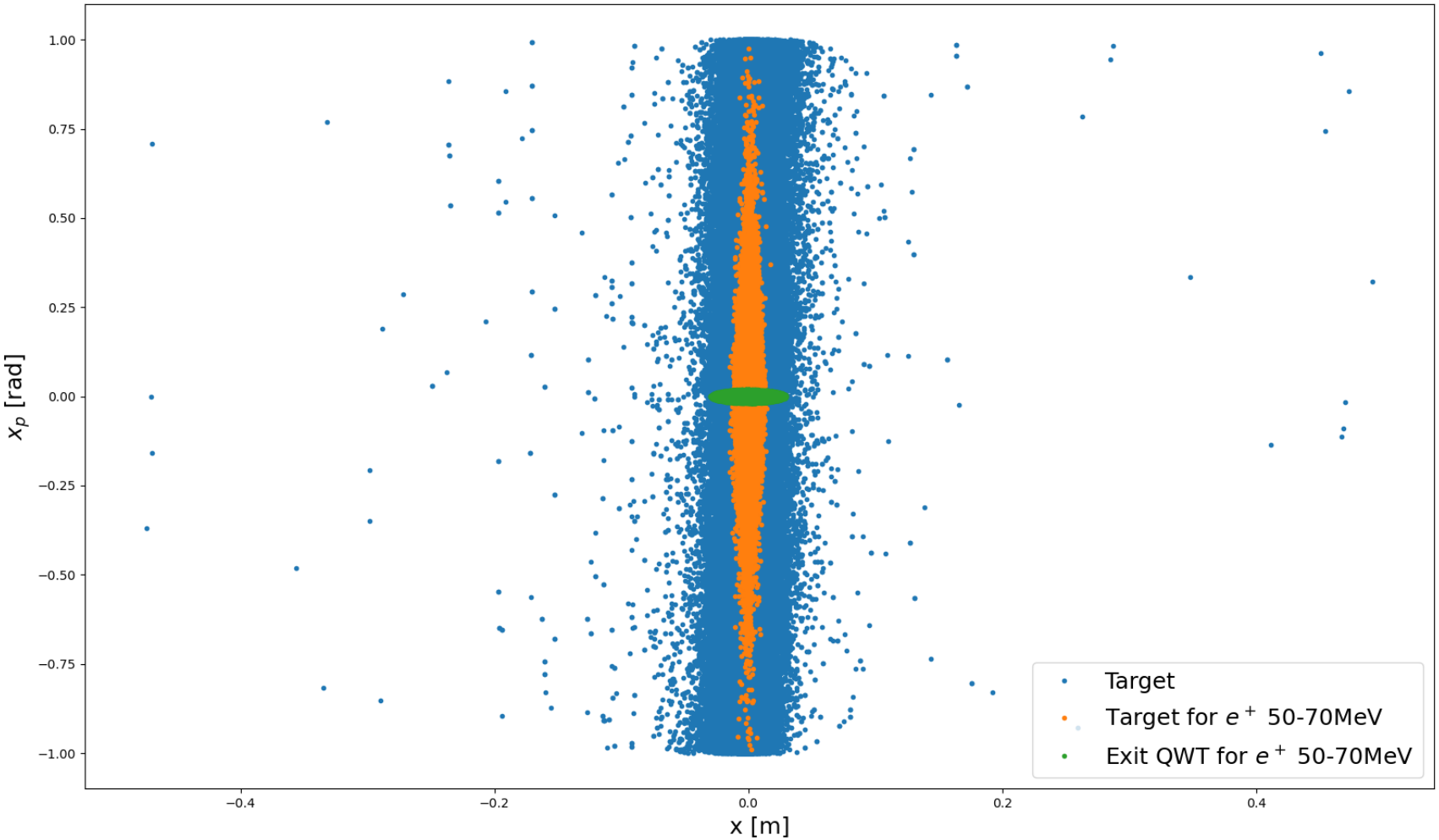
My Model in ELEGANT



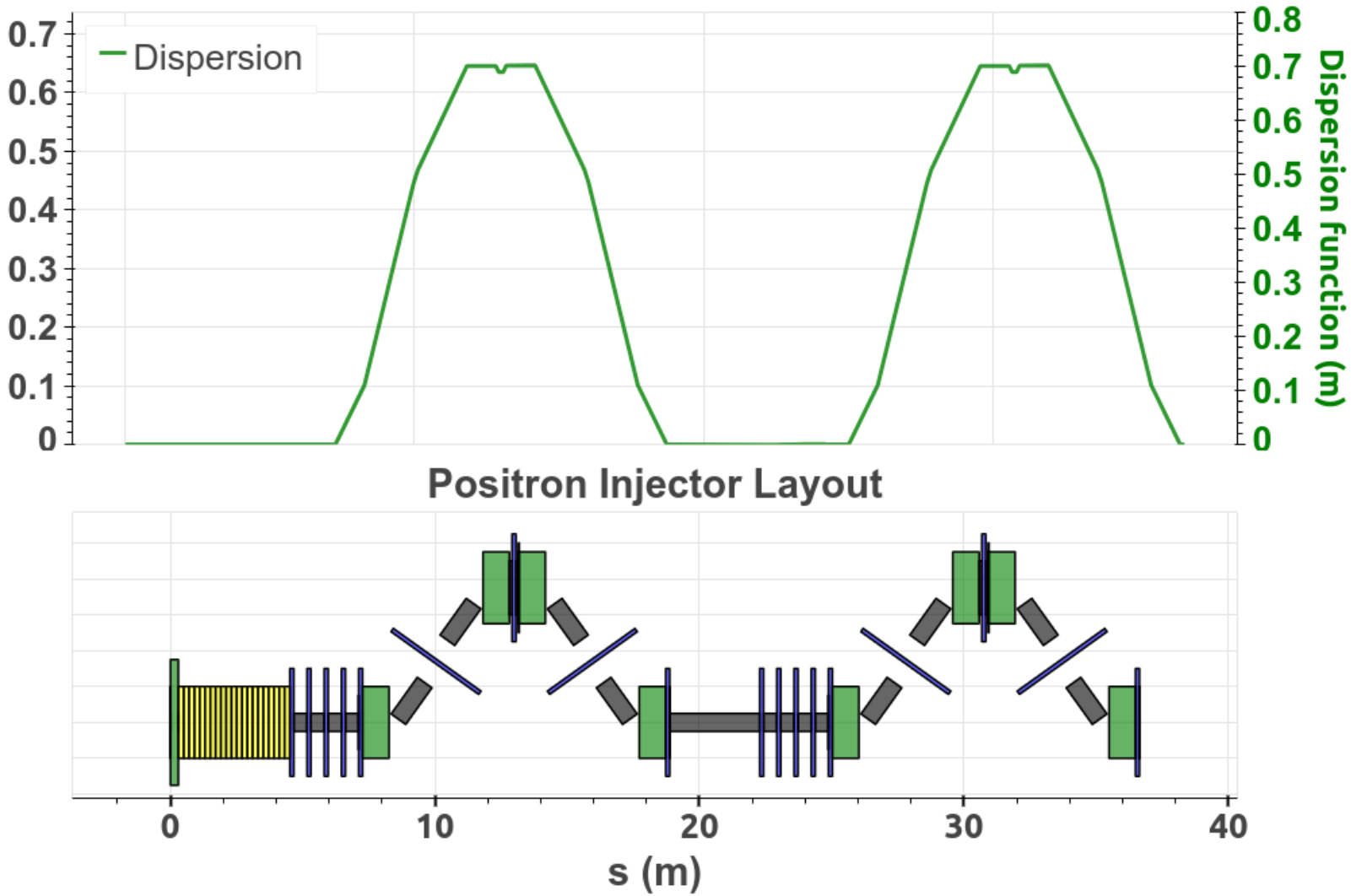
Phase space rotation

- The aim of use the QWT is to decrease the huge transverse momentum at the exit of target.
- The QWT is a short band acceptance.
- We want to rotate the $(x^{'},x)$ plane to reduce the transverse momentum spread.
- The total accelerator length (long solenoid + RF cavities) has been reduced from 15.4 m to 4.21.
- RF cavities period : $T_{RF} = 60.8\ ns$
- $B_1 = 2\ T$ corresponding to the length of $L = 32\ cm$

QWT phase space rotation

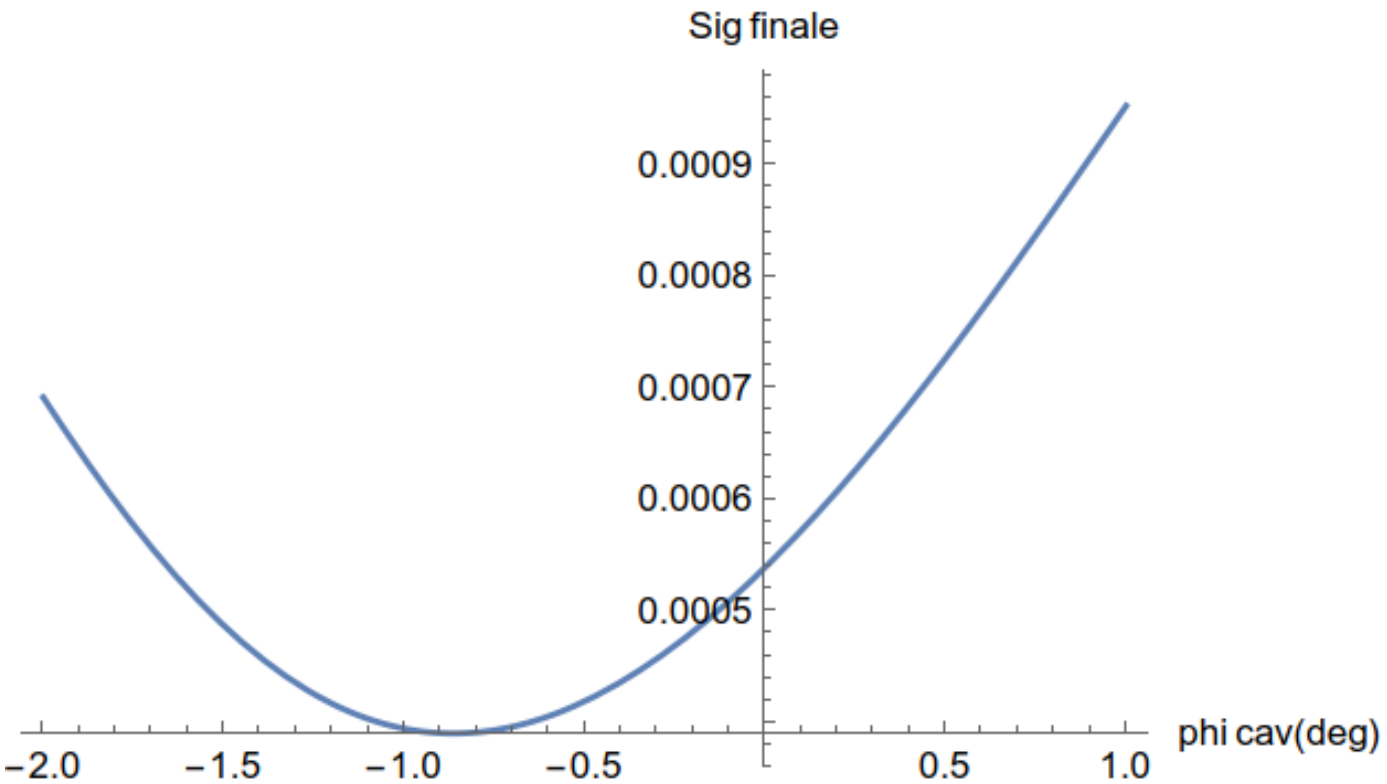


Positron layout : S02



$\delta p/p$ optimization

- The beam matrix at the exit of the second chicane is defined as: $\sigma_{exit} = M\ \sigma_0\ M^T$



$\delta p/p$ optimization