

# Positron collection system

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# Andriy's layout

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

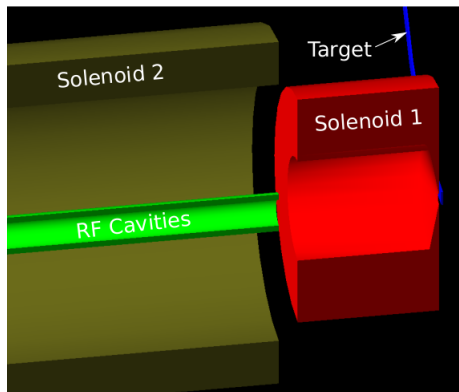
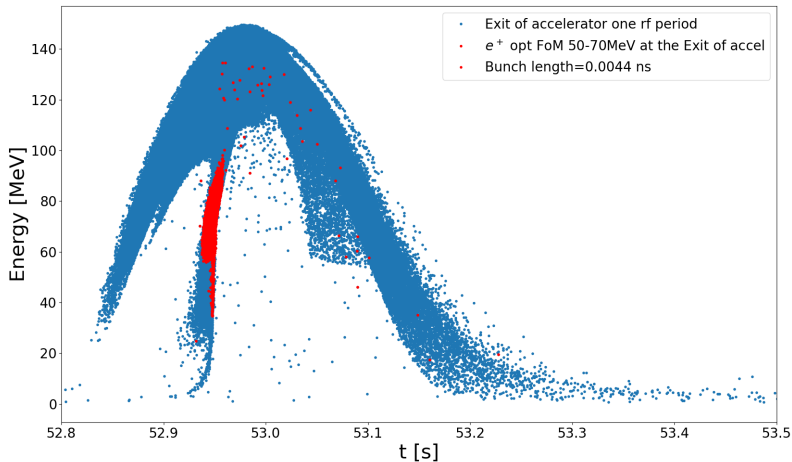


Figure: Target and QWT Geometry.

# Longitudinal positron phase space



# Longitudinal positron phase space in ELEGANT

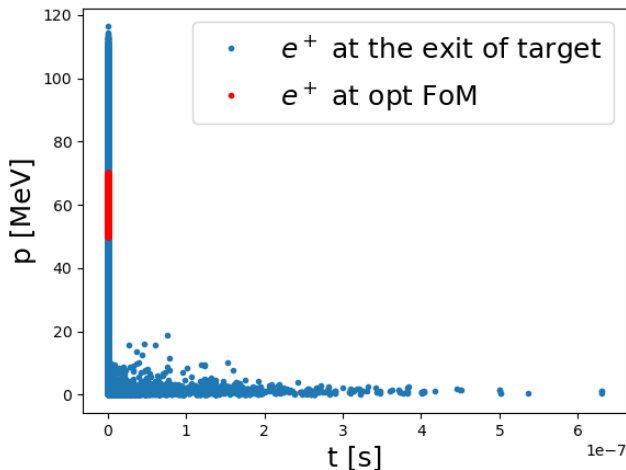
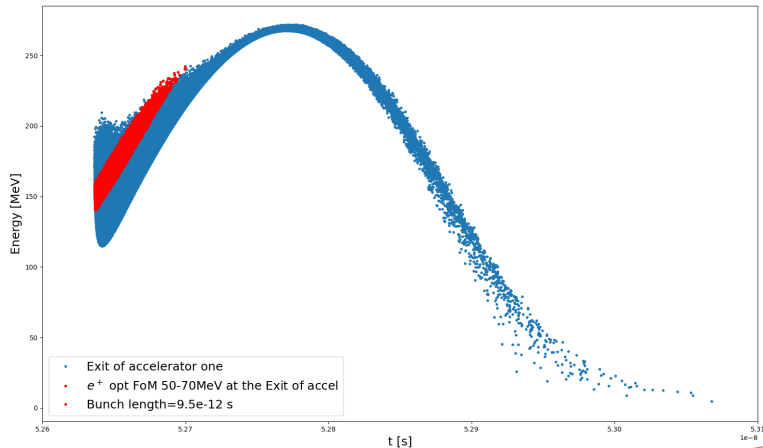
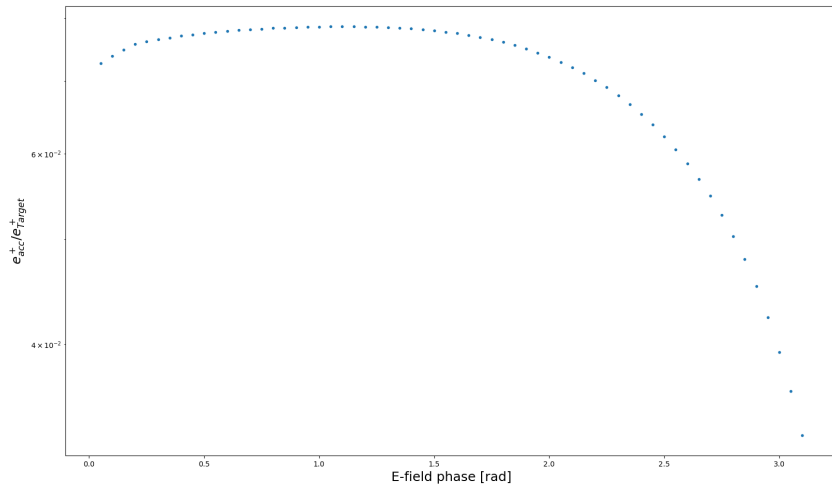


Figure: Positron distribution at the exit of Andriy's target

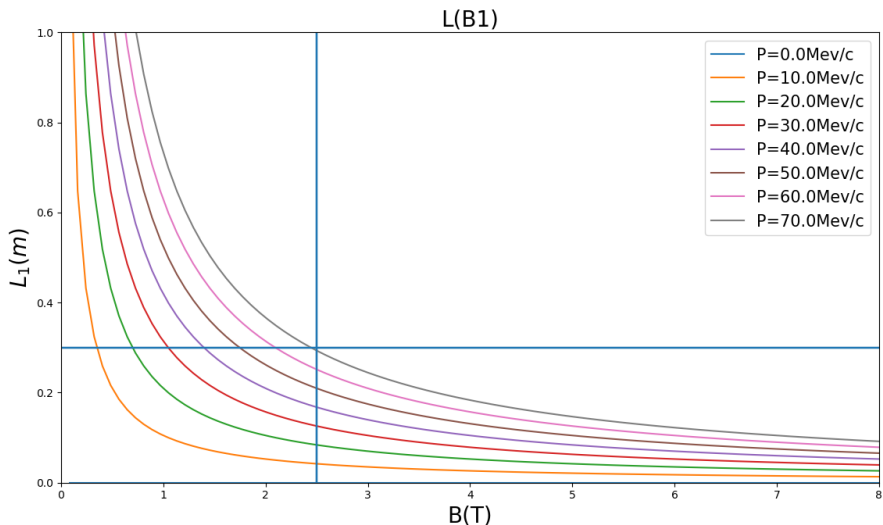
# Longitudinal positron phase space in ELEGANT At the exit of accelerator



# Optimum E field phase

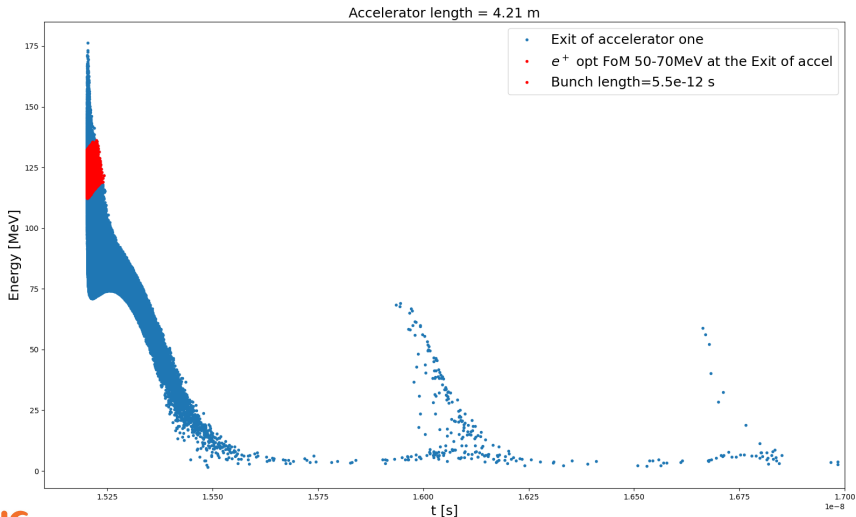


# Optimum QWT length



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

# My Model in ELEGANT

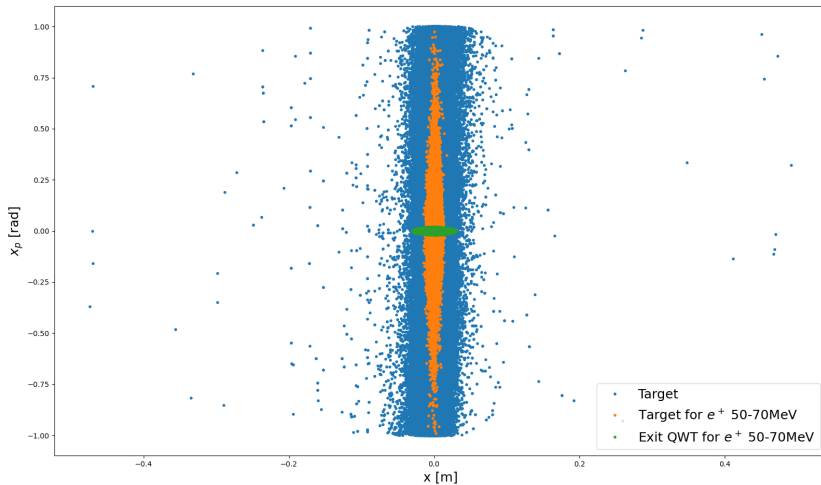




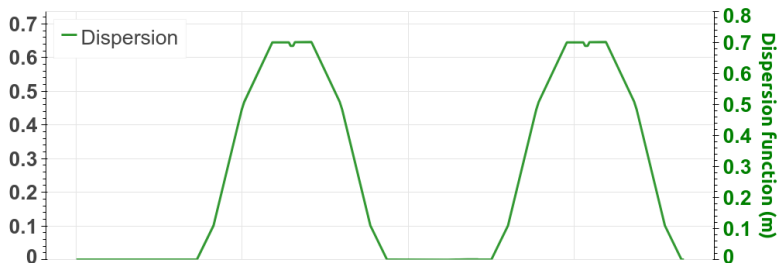
# Phase space rotation

- 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 :  $T_{RF} = 60.8 \text{ ns}$
- $B_1 = 2 \text{ T}$  corresponding to the length of  $L = 32 \text{ cm}$

# QWT phase space rotation



# Positron layout : S02



Positron Injector Layout

