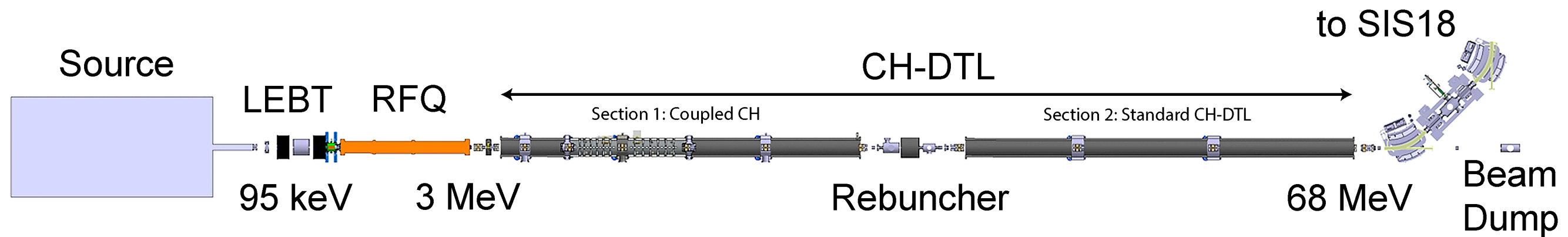
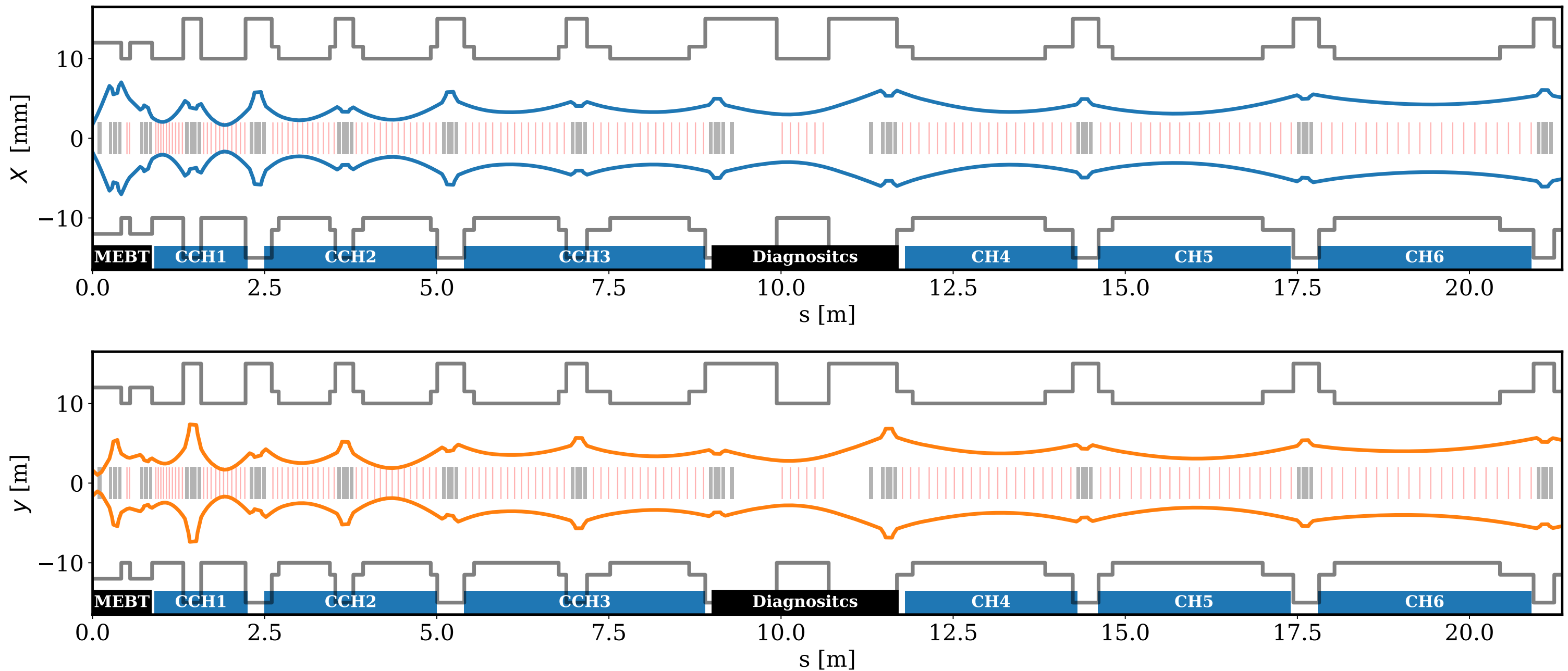


# Plinac overview



Beam energy	68 MeV
Beam current (op.)	35 mA
Beam current (des.)	70 mA
Beam pulse length	36 $\mu$ s
Repetition rate	< 4 Hz
Rf-frequency	325.224 MHz
Tot. hor. emit. (norm.)	2.1 / 4.2 $\mu$ m
Tot. mom. spread	$\leq \pm 10^{-3}$
Linac length	$\approx 35$ m

The TraceWin input file has been finally be handed to GSI



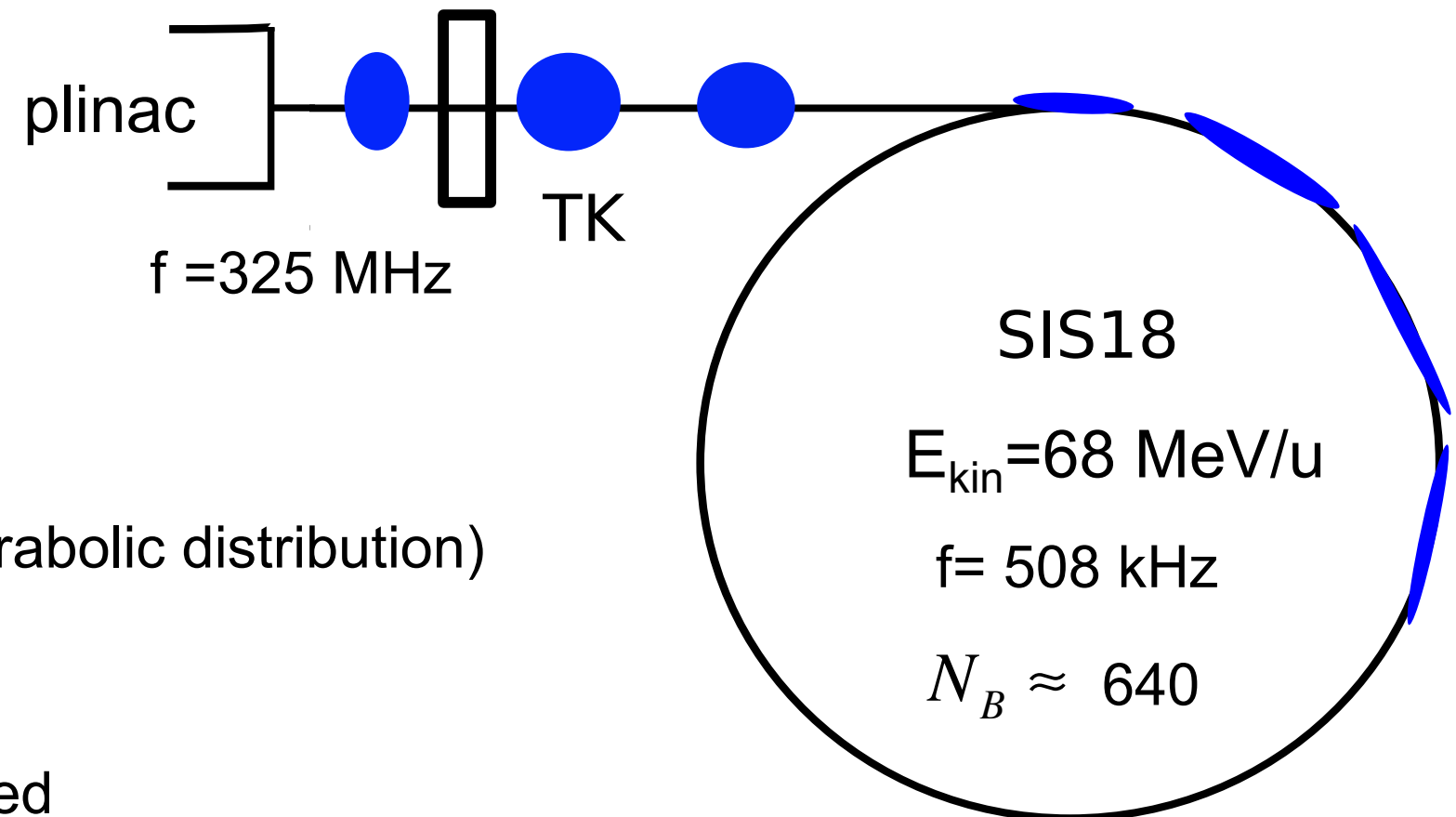
# Overview injection into SIS18

- During injection RF is turned off  
-> coasting beam formation

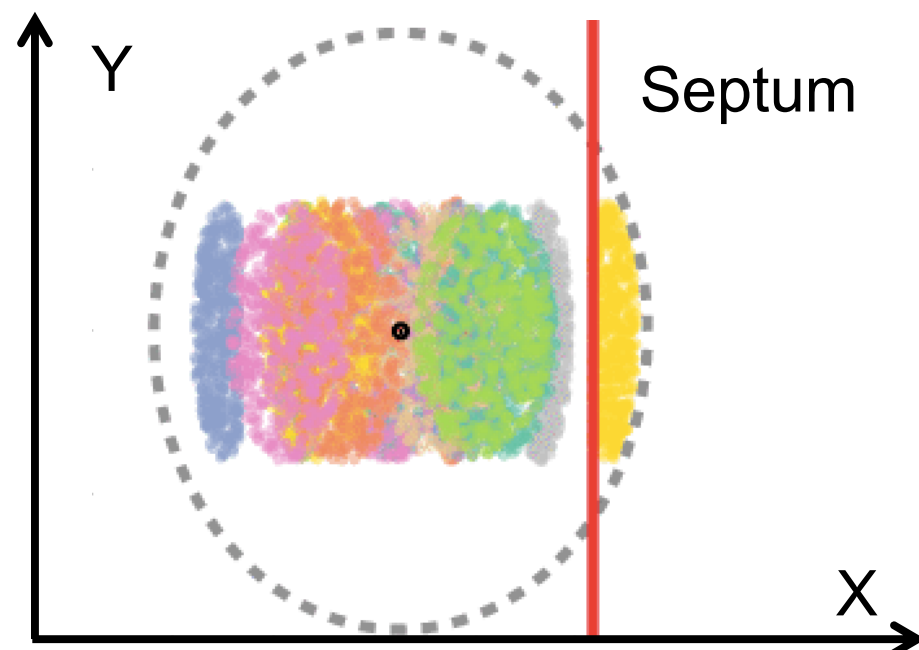
Final full momentum spread should be within the rf bucket area

$$\Delta p / p \leq 10^{-3}$$

(equivalent parabolic distribution)



- Injected beamlets are horizontal stacked



Transverse beam size (4 rms physical emittance) should be within the machine acceptance

$$\epsilon_x = 150 \text{ mm mrad} \quad \epsilon_y = 50 \text{ mm mrad}$$

(equivalent K-V distribution)

# Longitudinal beam quality

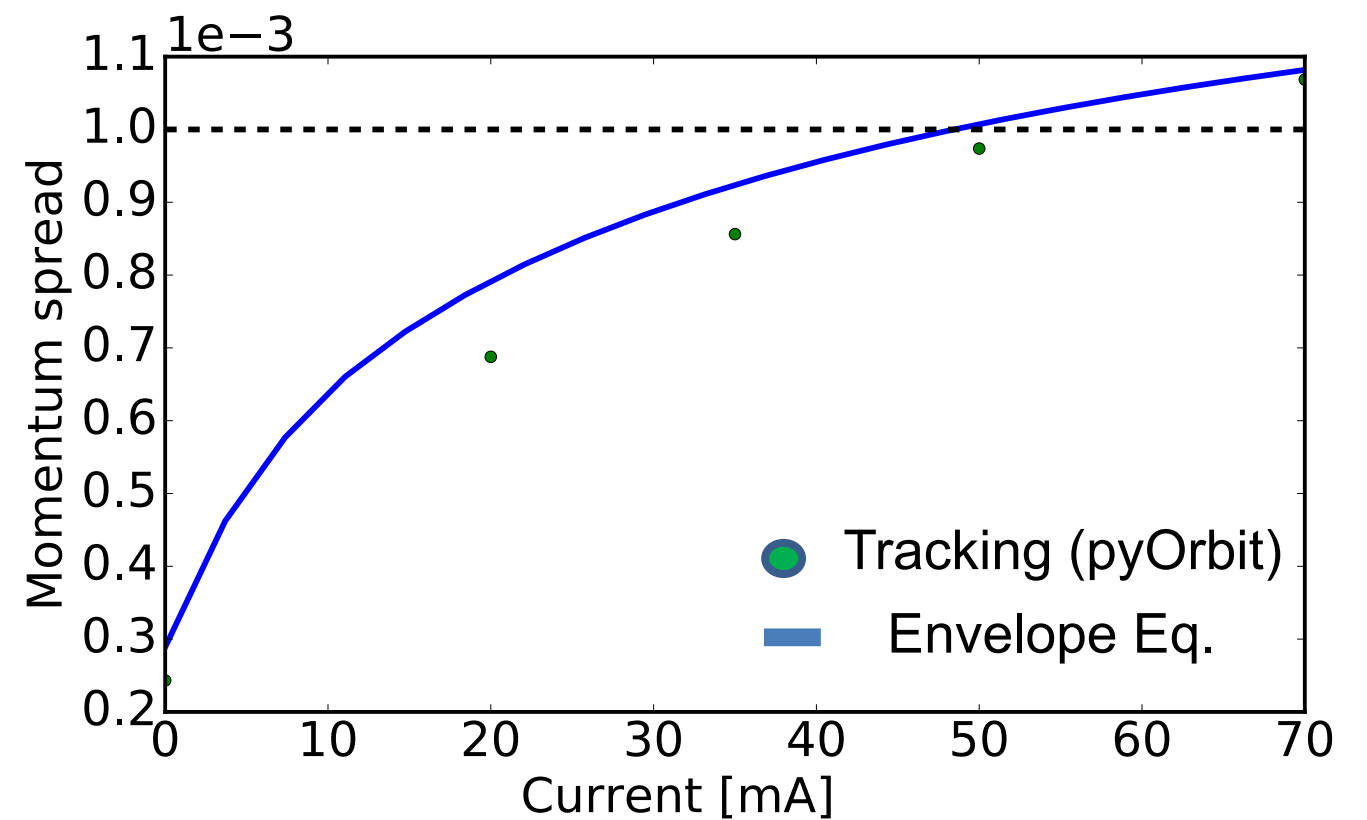
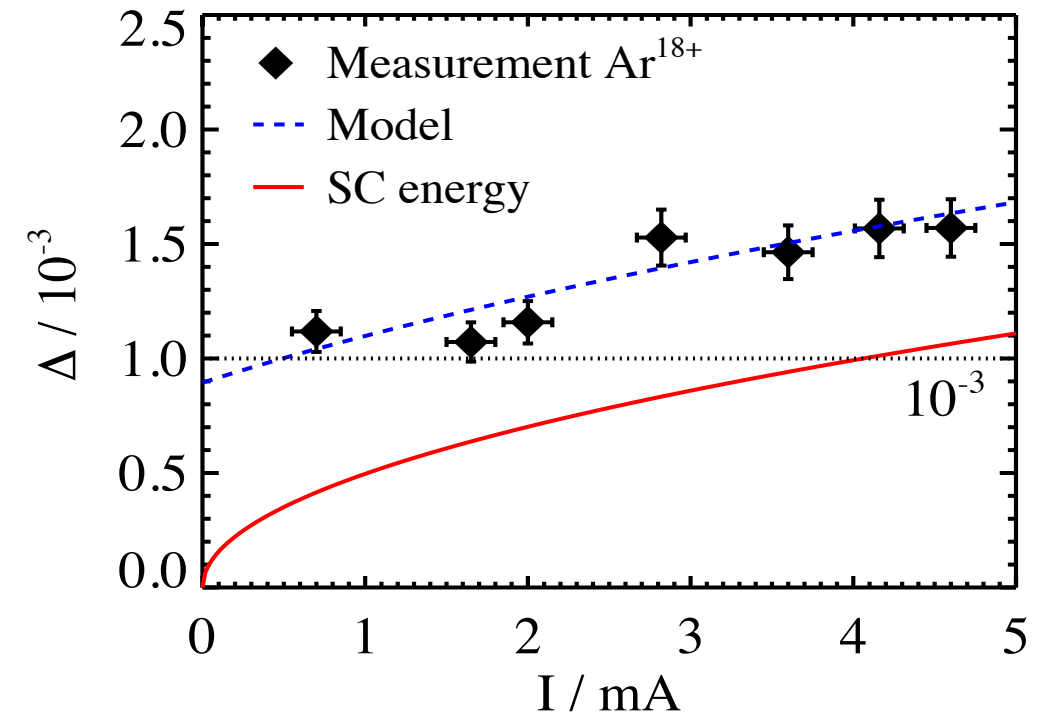
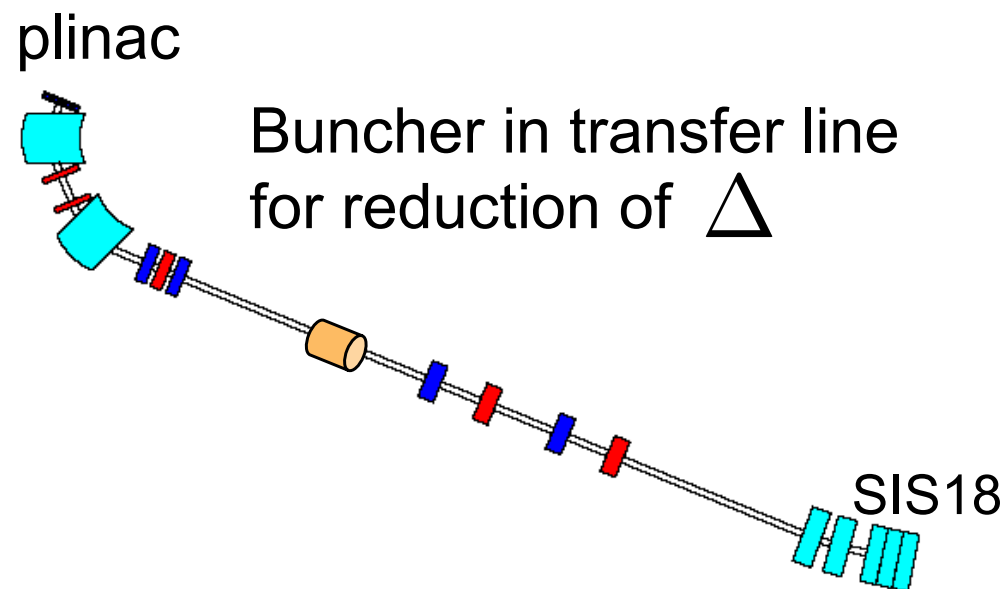
Measurements with UNILAC beams have shown:

Space charge and linac momentum spread are the main sources of SIS18 momentum spread

$$\Delta_f = \sqrt{\Delta_i^2 + \frac{2K_L}{\eta^2 z_{m,i}}}$$

SC energy is transformed into incoherent thermal momentum spread

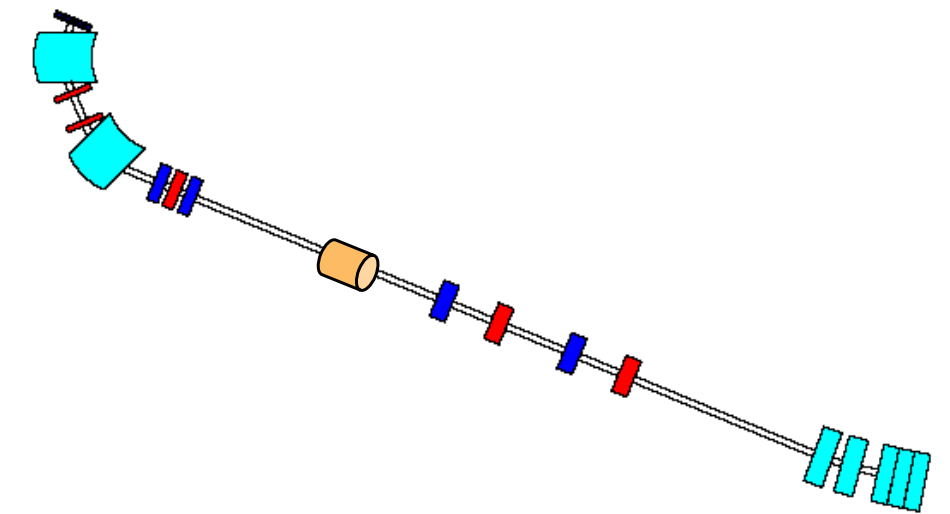
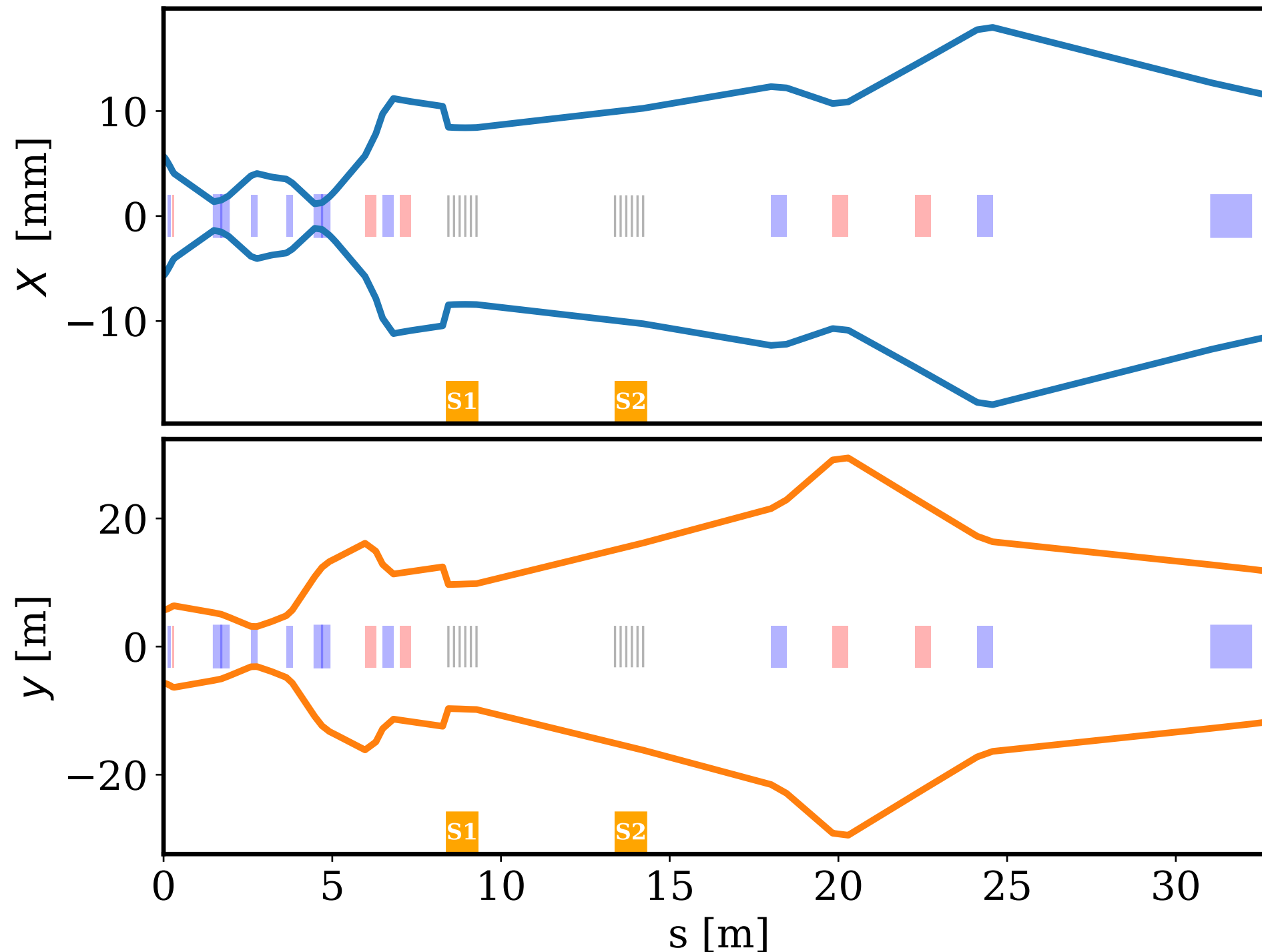
S. Appel et al: Phys. Rev. ST Accel. Beams 15, 054201 (2012)



During the debunching phase in synchrotron increase of  $\Delta$  due to space charge (unpreventable)

# Longitudinal beam quality

Two possible position for the buncher:



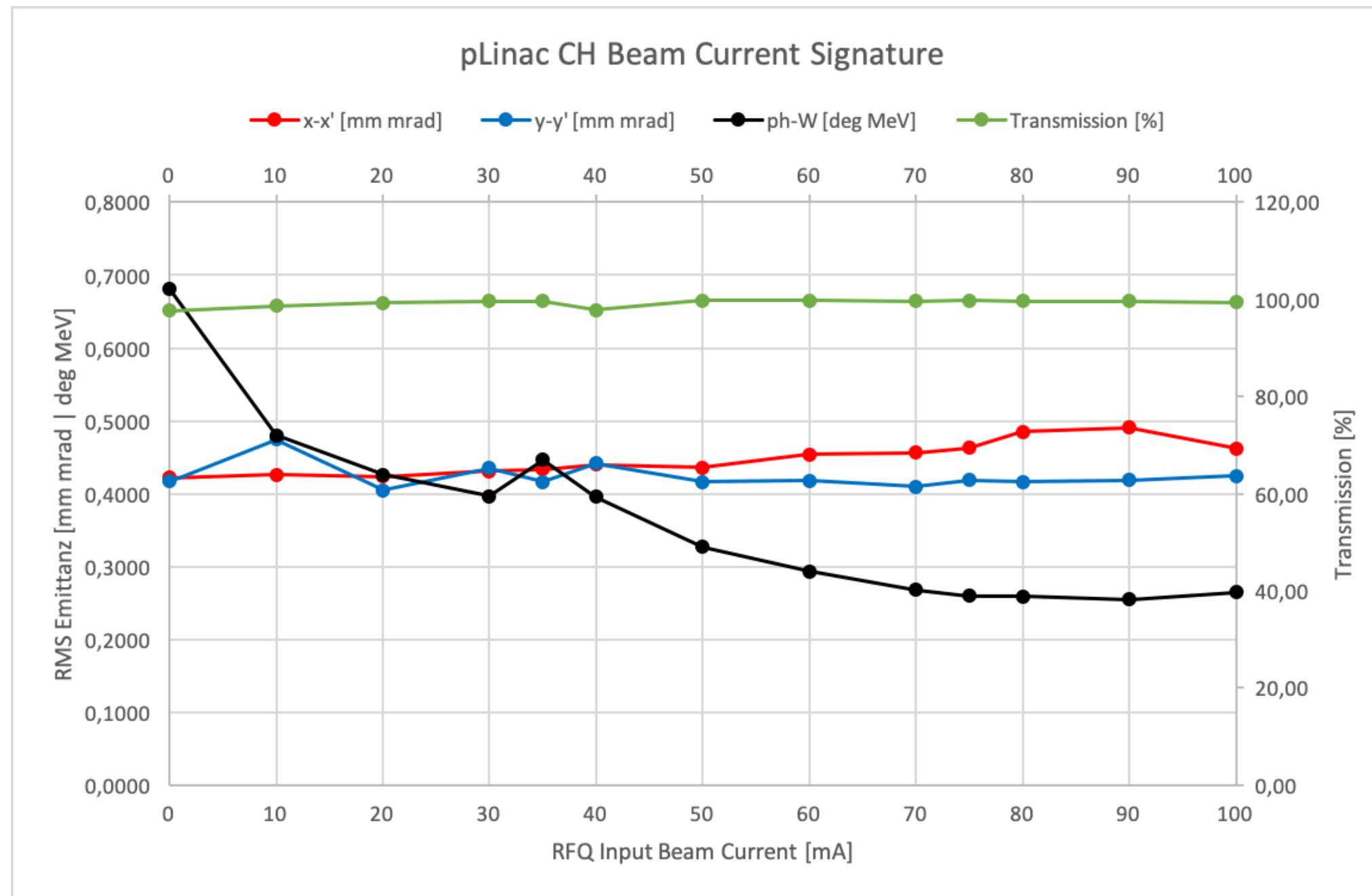
Position 1:  
free space 4 m,  
not baked area

Position 2:  
free space 1.6 m,  
baked area

Length of six gab  
buncher about  
one meter

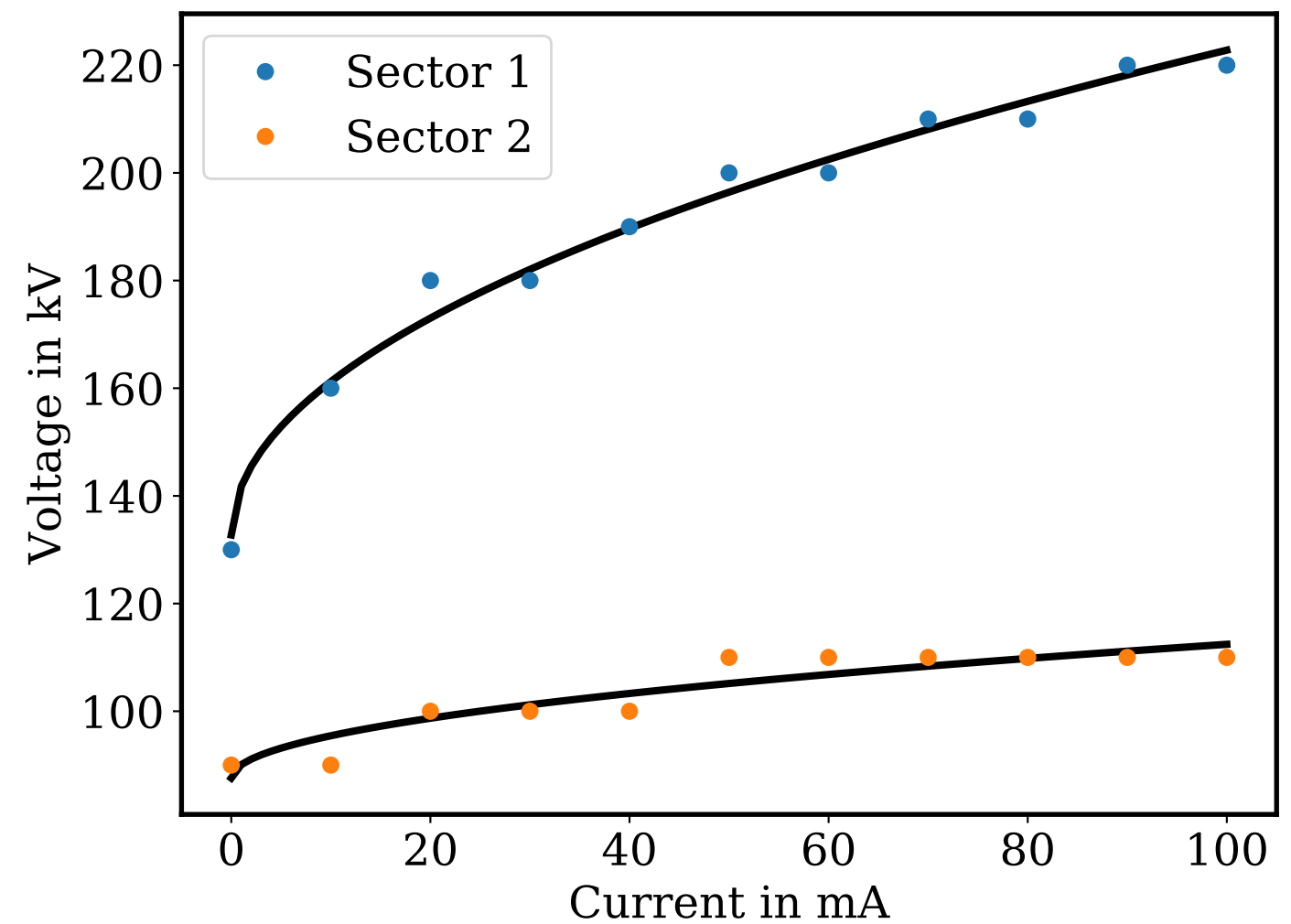
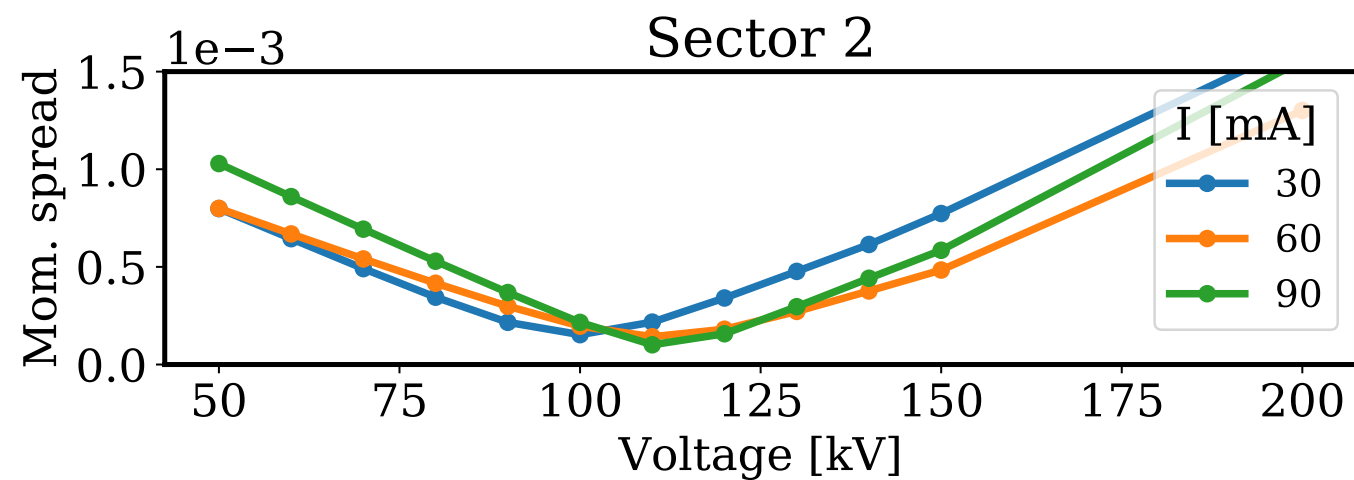
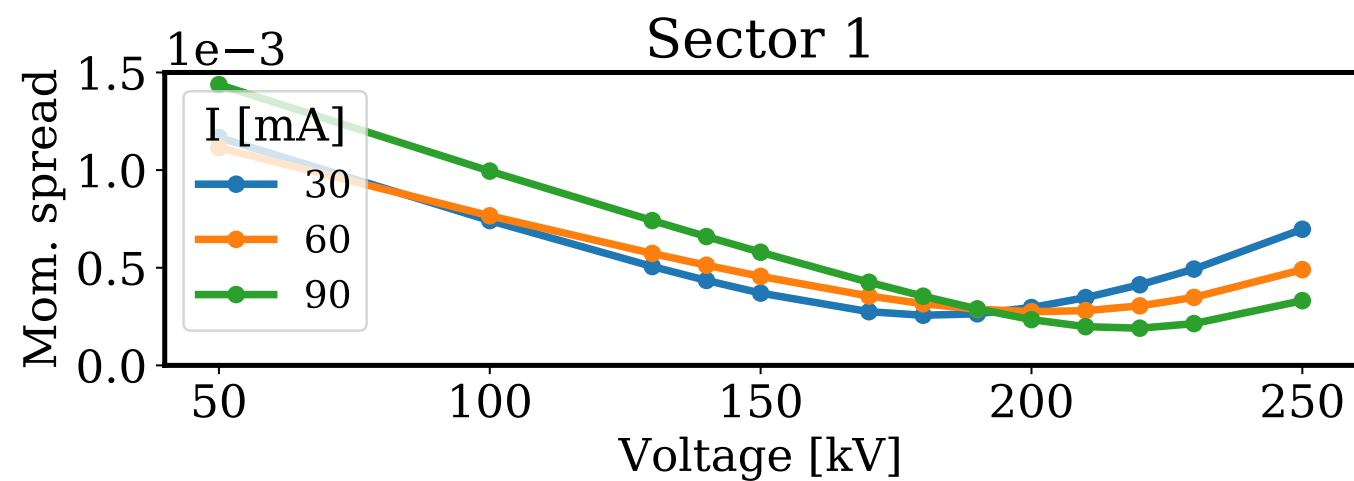
# Longitudinal beam quality

Input distribution from H. Hähnel for several currents  
For each current the RFQ + CH-DTL has been optimized



# Longitudinal beam quality

Optimal voltage depends on current ( $\sim\sqrt{\text{current}}$ )



# Longitudinal beam quality

