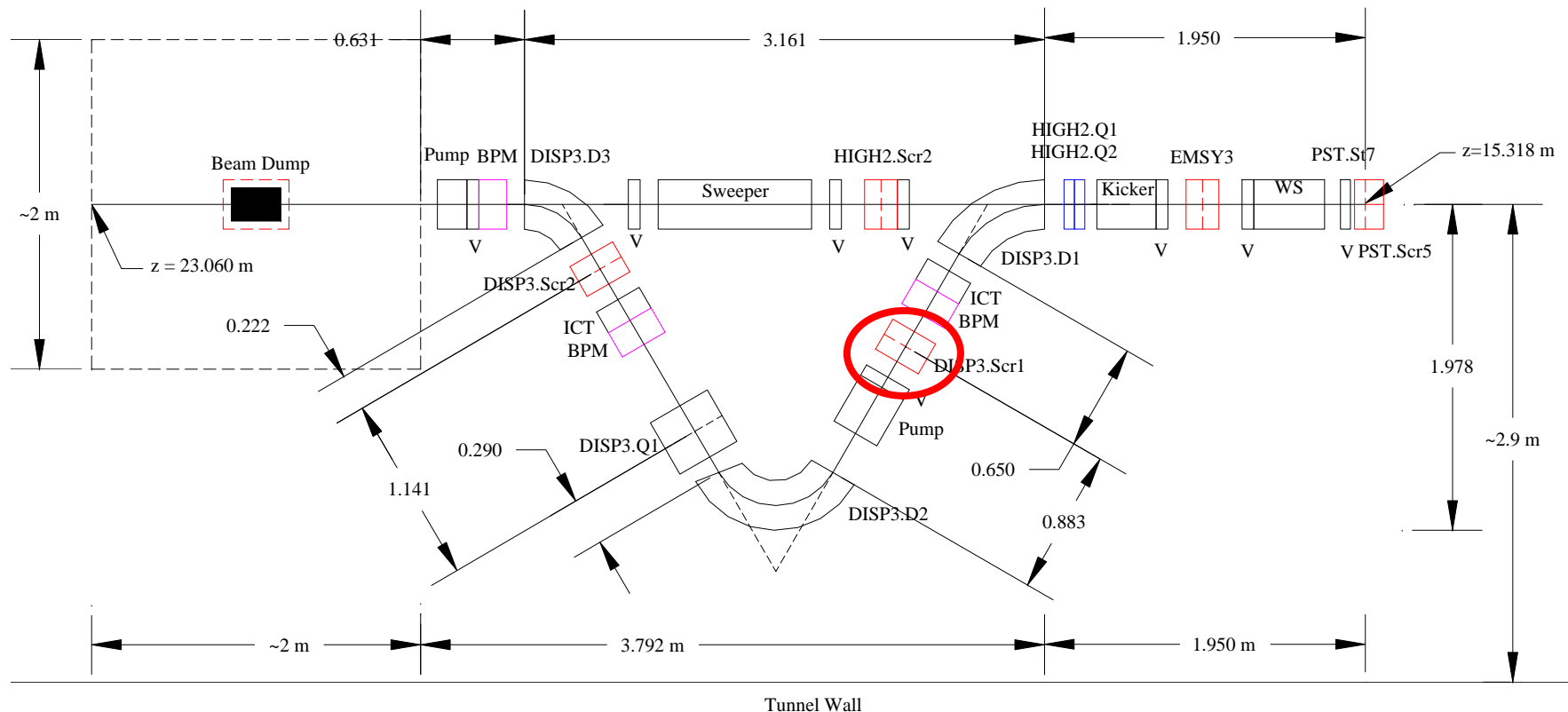
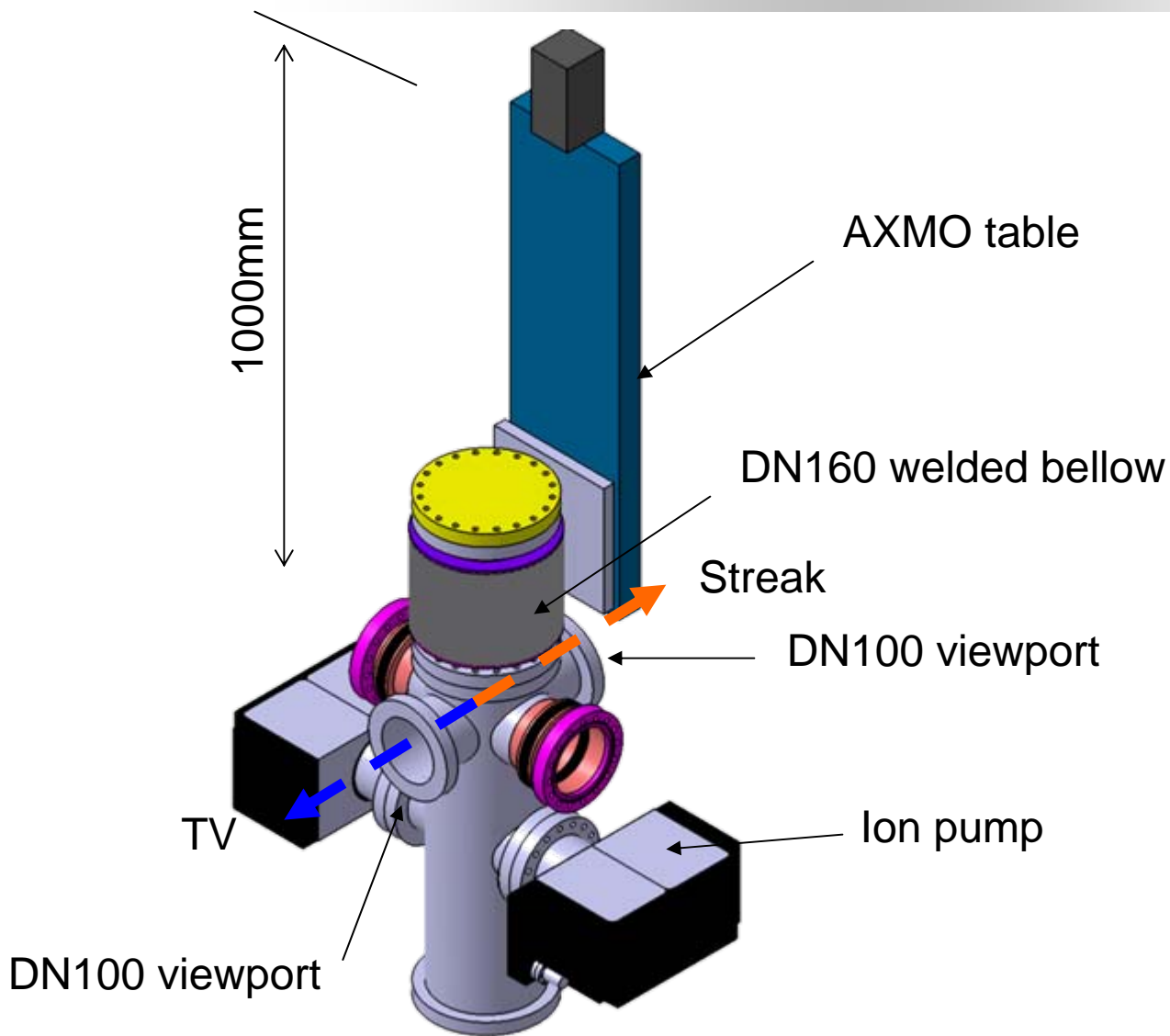


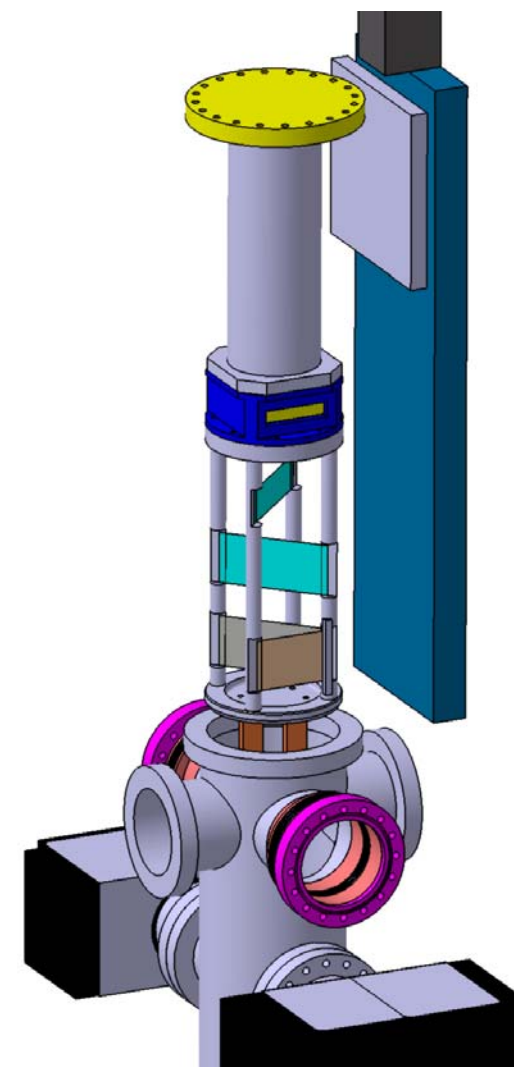
Considerations of off-set screens for DISP3.Scr1 Screen Station in HEDA2



DISP3.Scr1 Assembly

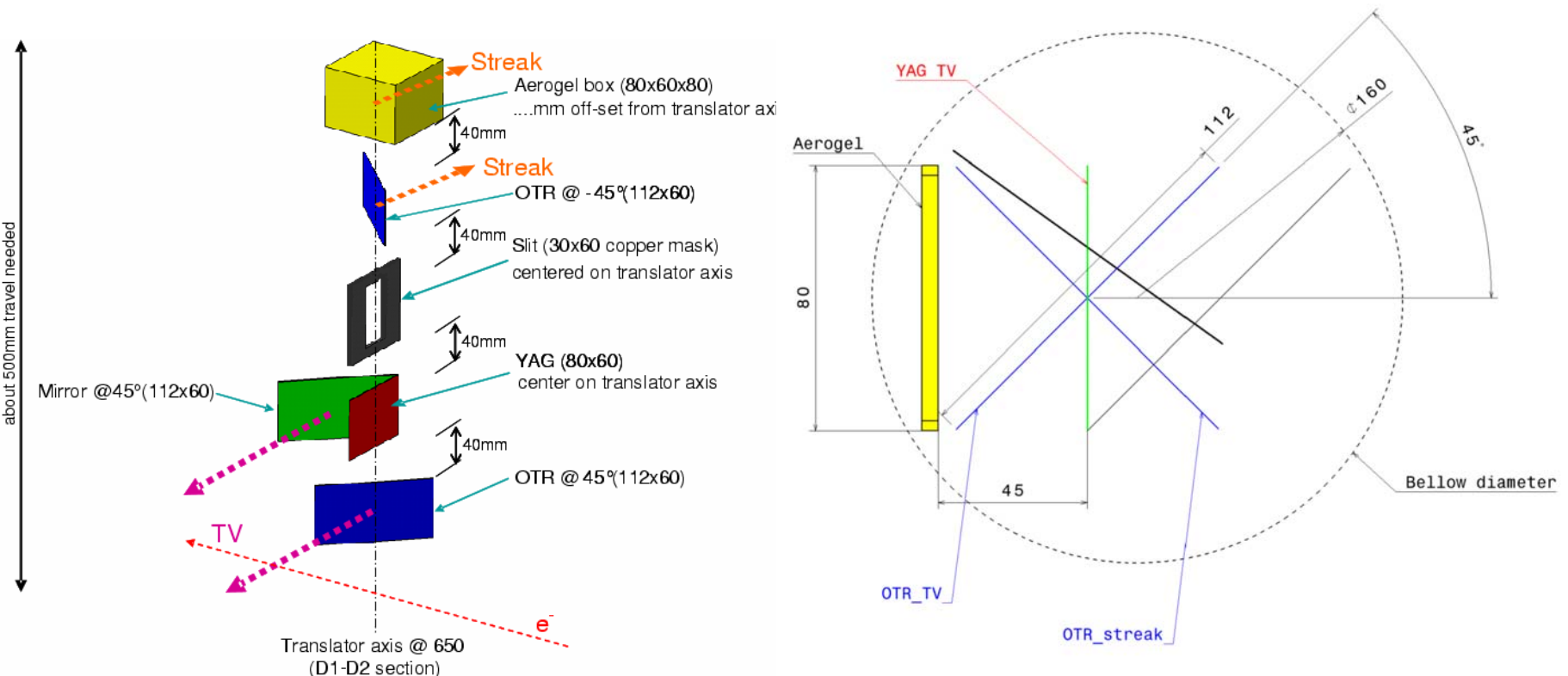


Aerogel screen on the beam axis



Actuator @ empty position

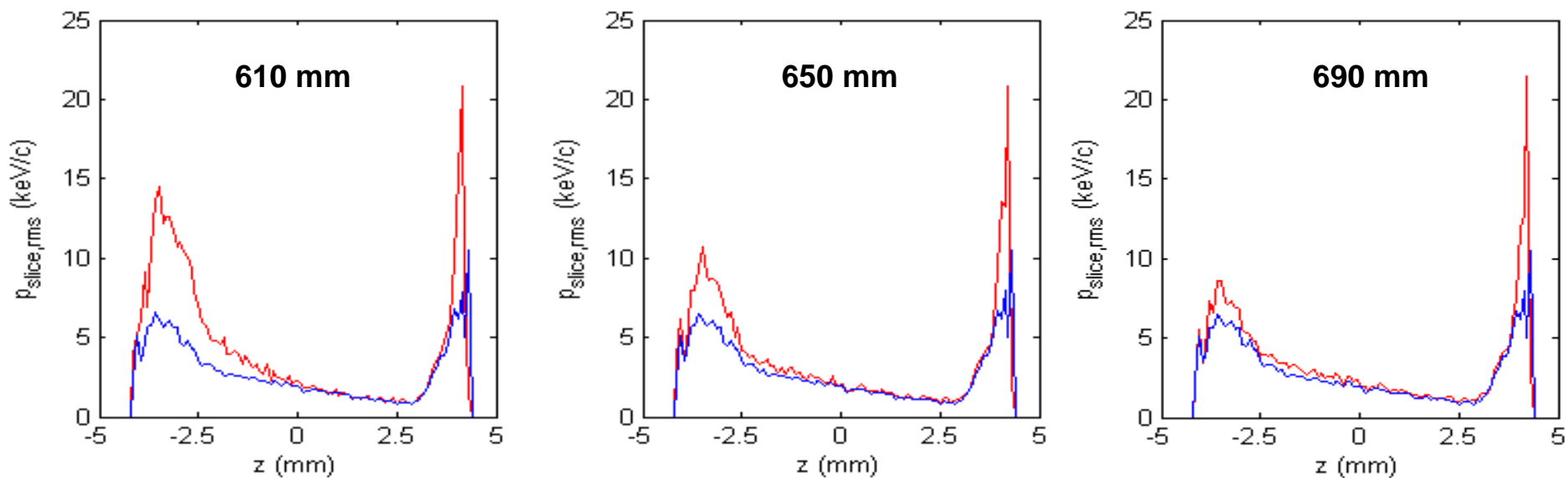
- all screen are placed at theoretical position (650mm after the DISP3.D1)
- optical system
 - 2 TV readouts: for 45mm off-set between YAG and OTR
 - 2 Streak readouts: for 45mm off-set between Aerogel and OTR
- bigger size of bellow is needed (DN160→DN200)
 - for DN200 bellow, effort force > 3000N is needed
 - AXMO linear actuator can handle ~3000N effort force
- larger whole screen station, bigger view-ports, larger vacuum volume (more pumping efficient)



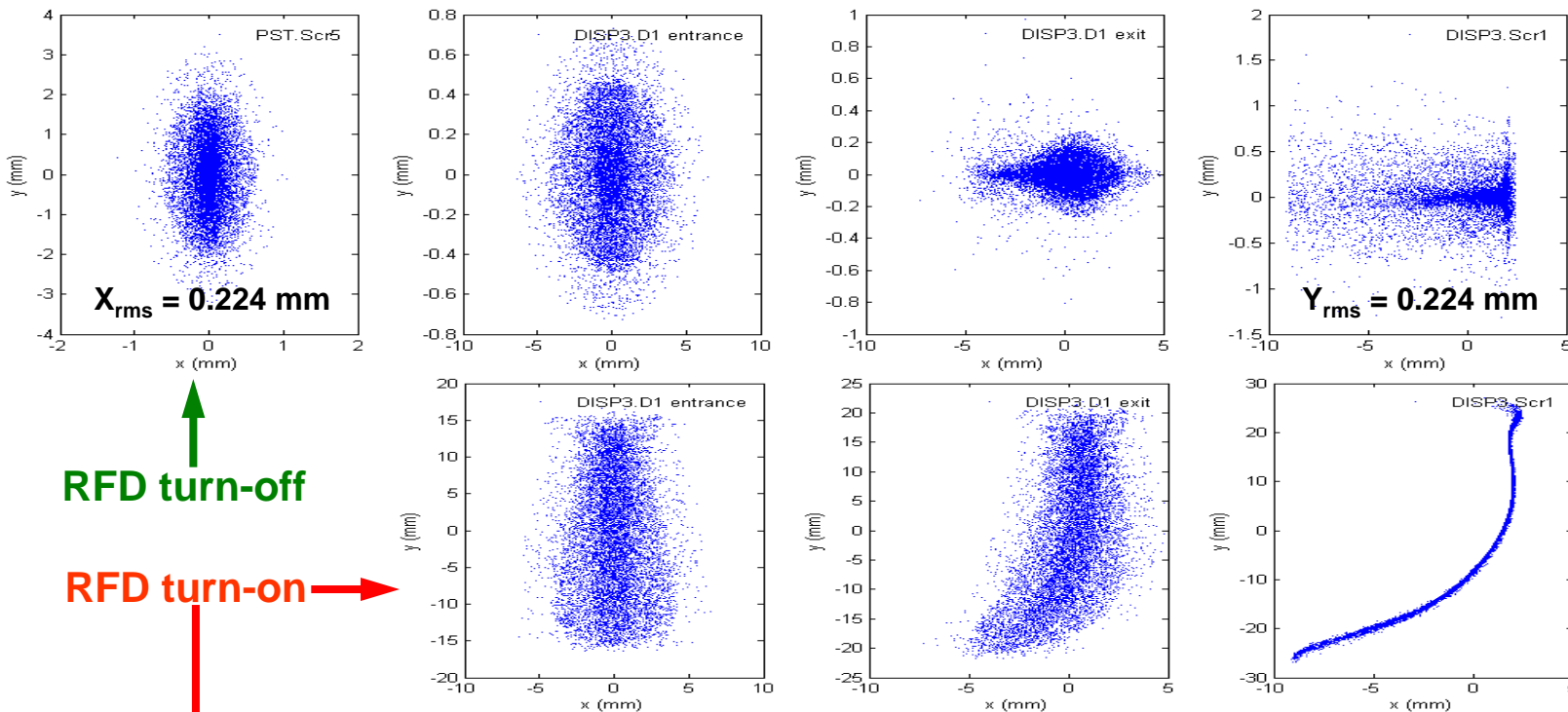
screen configurations: **off-set** between YAG and OTR screen (for RFD measurements)

D1 to Scr1 distance (mm)	Q1 (T/m)	$\langle p \rangle$ MeV/c		p_{rms} (keV/c)		$P_{rms, slice, min}$ (keV/c)		$P_{rms, slice, mean}$ (keV/c)	
		original	$\Delta \langle p \rangle / \langle p \rangle$	original	$\Delta p_{rms} / p_{rms}$	original	DISP3.Scr1	original	ref. Δ (%)
605	-1.97	32.07279	2.68×10^{-7}	106.142	-2.01×10^{-5}	0.759	0.811 (relΔ=6.9%)	2.873	63.1
610	-1.97	32.07279	2.8×10^{-7}	106.142	-1.32×10^{-5}	0.759	0.777 (rel Δ =2.4%)	2.872	53.0
650	-1.91	32.07284	6.1×10^{-8}	106.151	-1.90×10^{-5}	0.774	0.964 (relΔ=24.5%)	2.881	28.4
690	-1.87	32.07289	-3.9×10^{-8}	106.155	-5.69×10^{-6}	0.793	1.067 (rel Δ =34.5%)	2.893	21.3
695	-1.86	32.07291	-1.0×10^{-7}	106.156	-2.33×10^{-6}	0.799	1.079 (relΔ=35%)	2.898	19.3

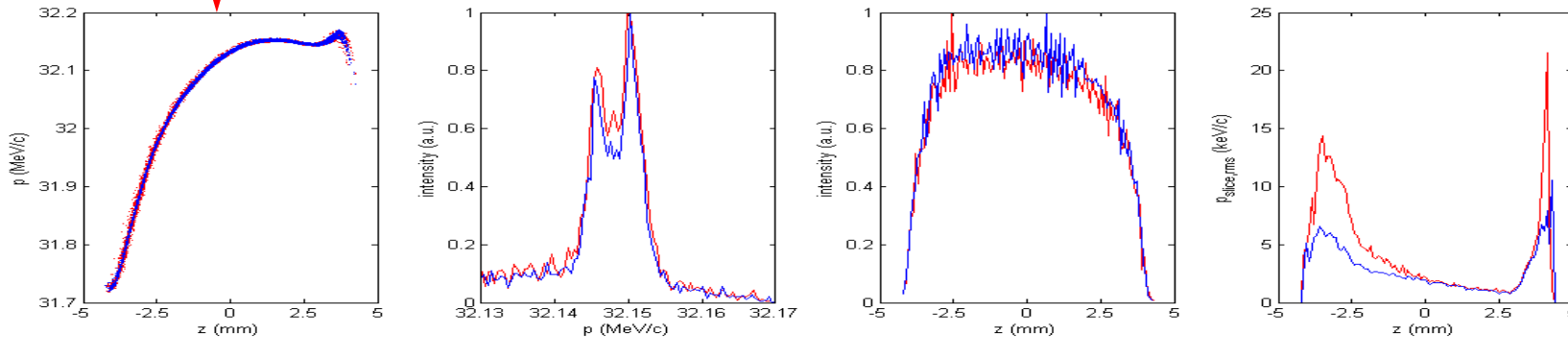
Slice momentum spread distribution at the positions 610, 650, and 690 mm after the DISP3.D1 dipole magnet (blue \rightarrow @PST.Scr5, red \rightarrow @considered position after DISP3.D1)



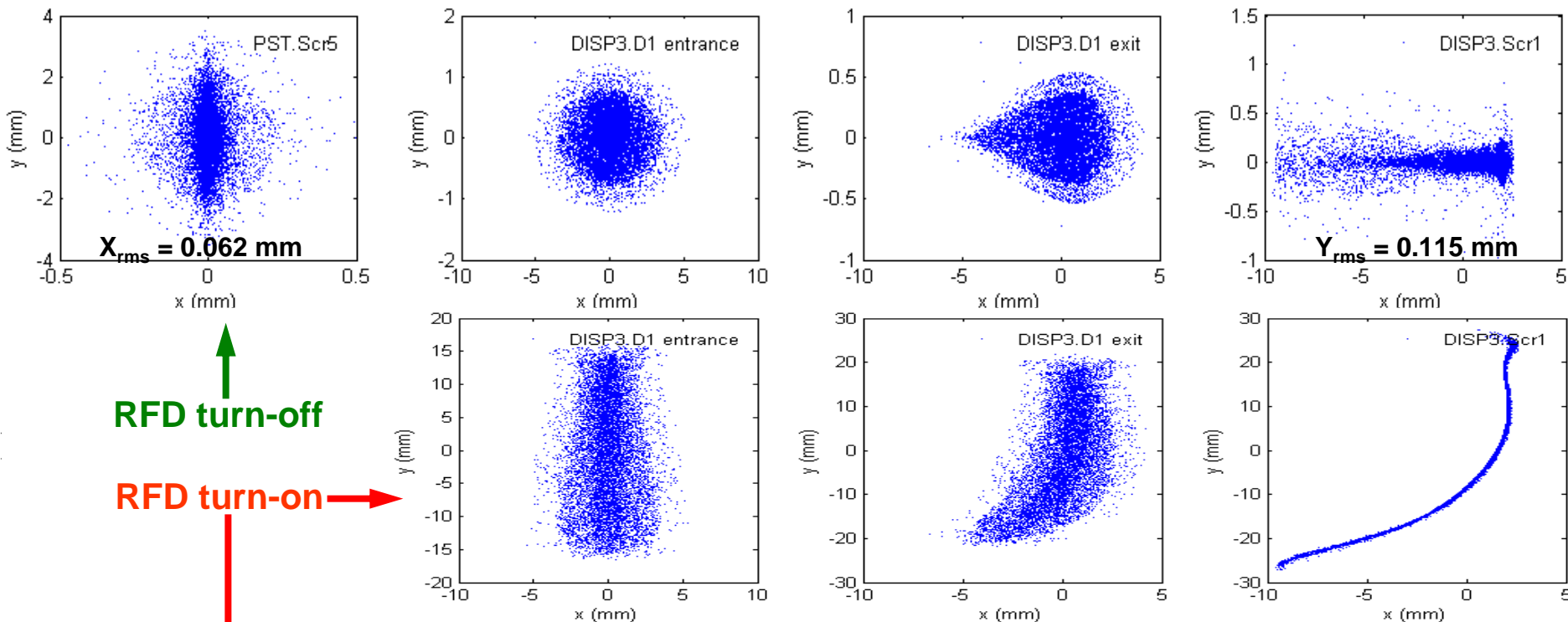
Transverse distribution



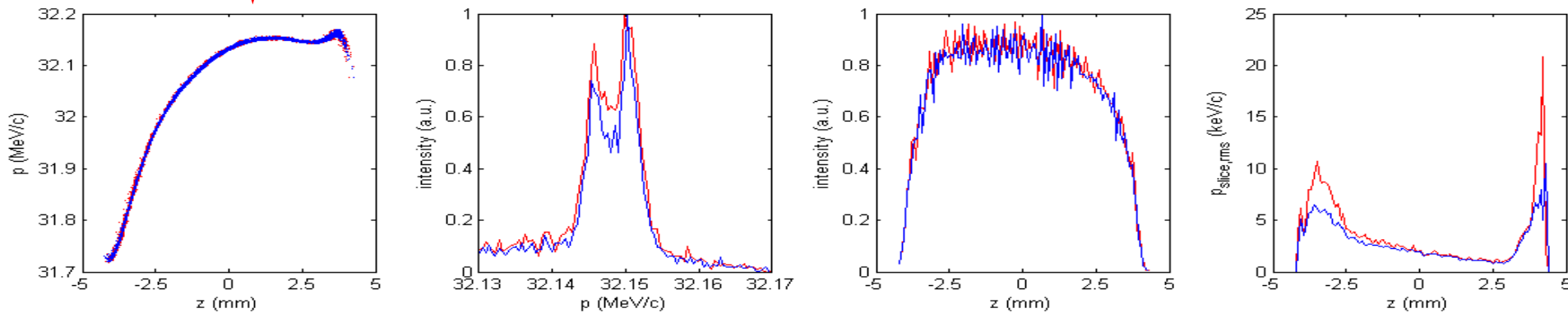
Longitudinal distribution at DISP3.Scr1 (red) compared to distribution at PST.Scr5 (blue)



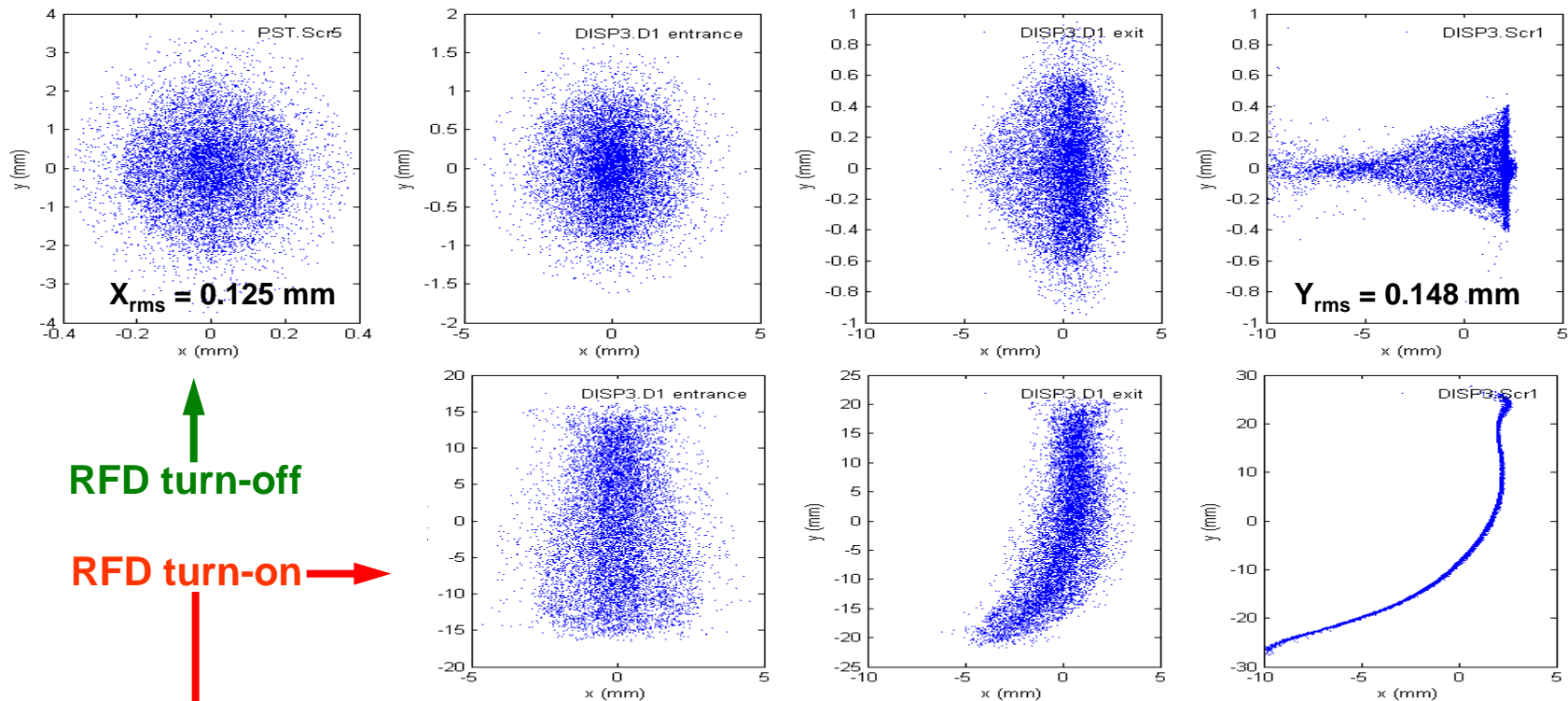
Transverse distribution



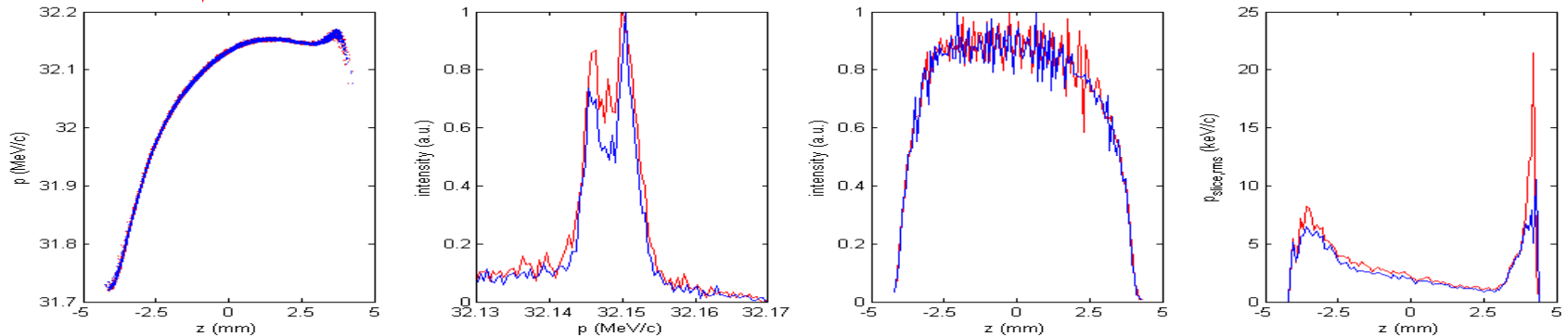
Longitudinal distribution at DISP3.Scr1 (red) compared to distribution at PST.Scr5 (blue)

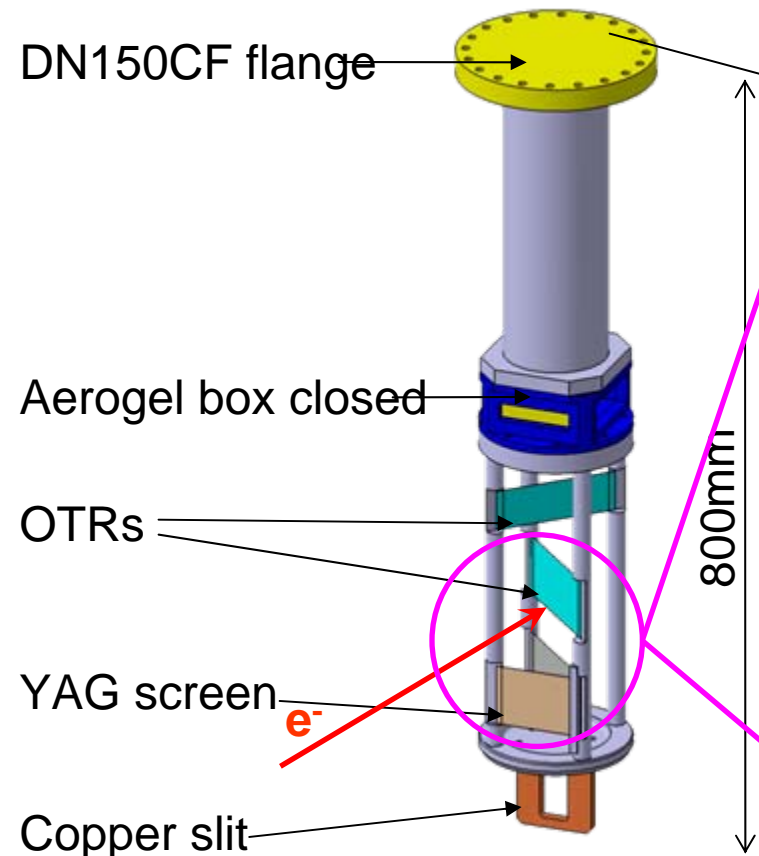


Transverse distribution



Longitudinal distribution at DISP3.Scr1 (red) compared to distribution at PST.Scr5 (blue)





In LAL design: YAG and Aerogel @ 605mm and OTR @ 650mm
 \Rightarrow good resolution for $p_{\text{rms,slice,min}}$, but worse $p_{\text{rms,slice,mean}}$

- Off-set of 45mm configuration is preferable for screen station technical design from LAL
 - YAG or OTR has off-set of 45mm
 - Aerogel screen has off-set of 45mm from theoretical position (@650mm)
- radiation light exits view-port on the same axis for YAG/OTR and for Aerogel/OTR
 - only 1 TV and 1 streak readout
 - view-ports of 100mm diameter can be used
- can stay with bellow DN160
 - effort force for actuator linear table < 3000N
 - AXMO linear actuator can handle ~3000N effort force
- Symmetry of screen holder is reserved

If we place YAG @ 650mm and OTR @ 695mm
 \Rightarrow good resolution for $p_{\text{rms,slice,mean}}$, but worse $p_{\text{rms,slice,min}}$

- Symmetry of screen holder is not reserved