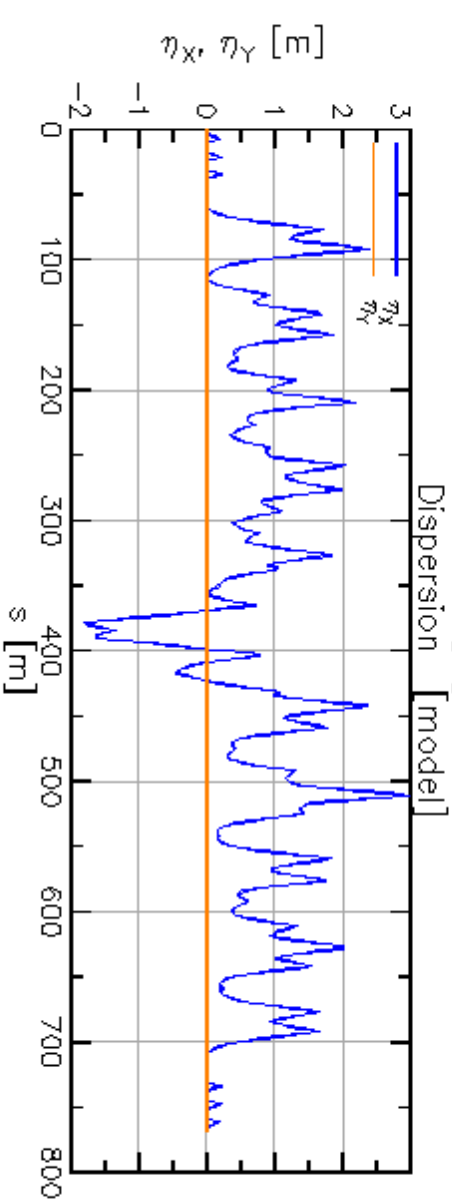
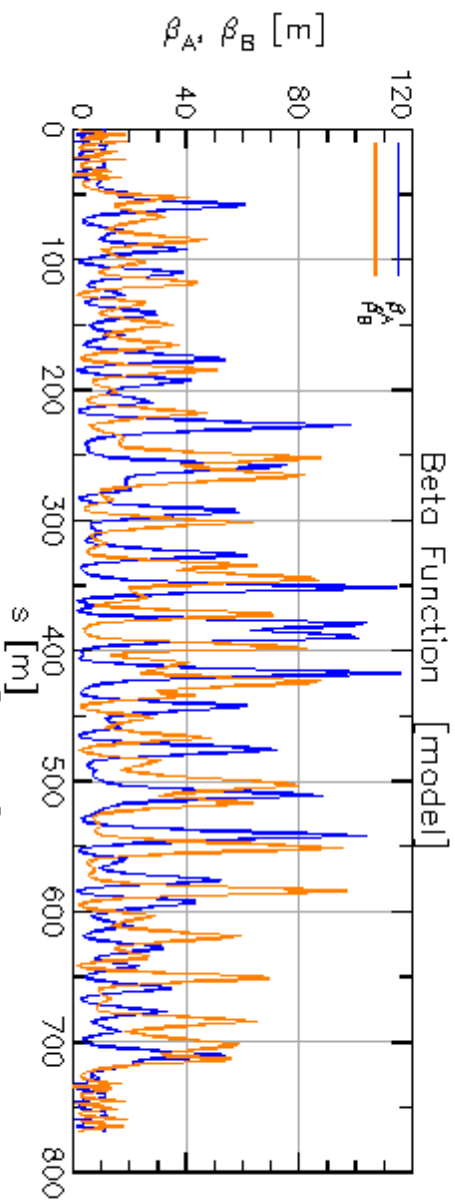


OSC simulation update

Suntao Wang

1. Evaluate Will's long bypass

1/15/2019



Try3 (fix the nonlinearity in bypass)
Add two more sextupoles
(Jan 14, 2018)

Bypass delay: 0.6332 m

m51: -3.1380E-03 m52: 2.6078E-02
m56: 1.0313E-03 m56_t: 2.2473E-06

Damping ratio: $\lambda_x/\lambda_s=457.9$

Cooling range:

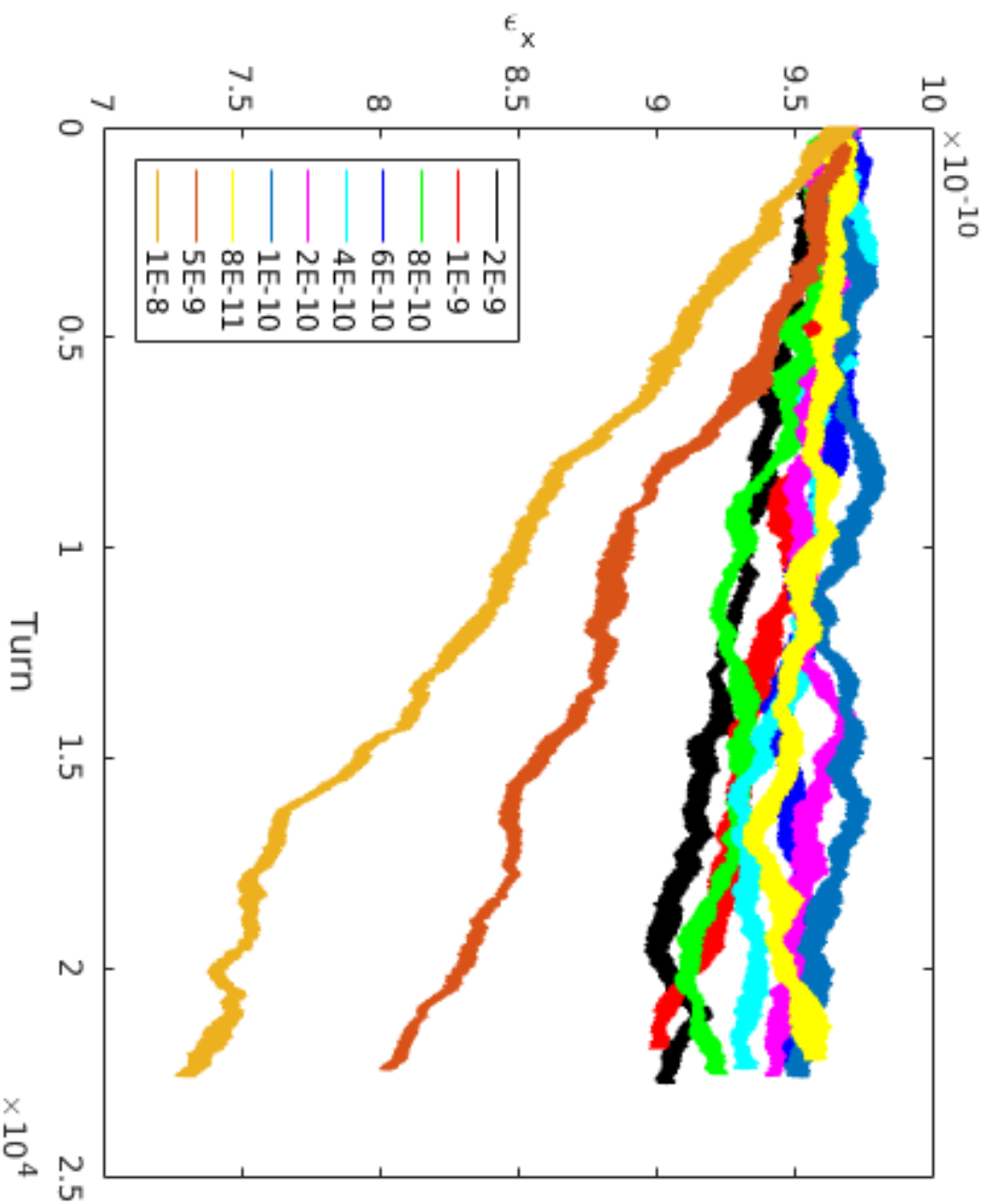
$\epsilon_{x_max} = 10.91E-09$ $\delta p/p_{max} = 1.363E-01$
 $n_x = 3.36$ $n_z = 365.2$

Radiation damping time ~ 0.5s

	X	Y
	Model	Design
Q	16.5402	16.5402
Chrom	4.1456	4.1456
J_damp	1.0993	1.0993
Emitance	9.632E-10	9.632E-10
Alpha_damp	1.950E-06	1.950E-06
	Model	Design
Z_tune:	2.676E-02	2.676E-02
Sig_E/E:	3.731E-04	3.731E-04
Sig_z:	9.973E-03	9.973E-03
Energy_Loss:	3.548E+03	3.548E+03
J_damp:	1.899E+00	1.899E+00
Alpha_damp:	3.369E-06	3.369E-06
Alpha_p:	5.844E-03	5.844E-03
	Model	Design
	! The design value is calculated with RF on	
	! Only calculated when RF is on	
	! Energy_Loss (eV / Turn)	
	! Longitudinal Damping Partition #	
	! Longitudinal Damping per turn	
	! Momentum Compaction	

Track 1000 particles, Radiation and damping on, incoherent kicks for 1E7 particles

With helical undulator custom tracking model



$$\varepsilon_x = a_0 \exp(-x/a_1)$$

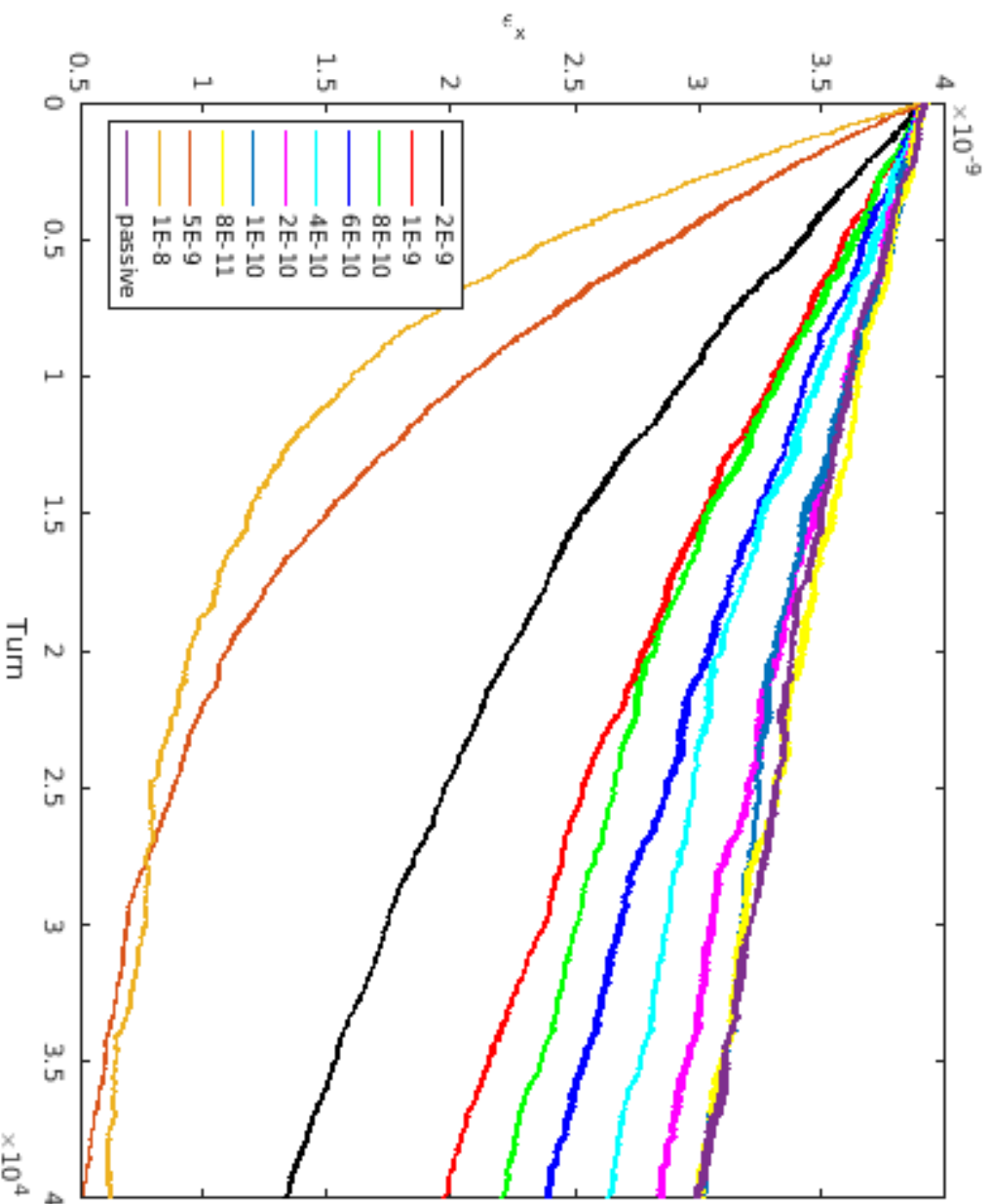
For $g=1E-9$

$a_1=3.8086e+05$ (turns)

Cooling time is about 6 times longer than that of the 2mm bypass.

Track 1000 particles, Radiation and damping on, incoherent kicks for 1E7 particles

With helical undulator custom tracking model



$$\epsilon_x = a_0 \exp(-x/a_1)$$

For $g=1E-9$

$a_1=5.7259e+04$ (turns)

2mm bypass

Summary

- Observe cooling in Will's long bypass lattice but the cooling time is much longer than the 2mm bypass lattice.