Tune Difference in Damping Ring

- The model lattice tune after injection tuning

$$(\nu_x,\ \nu_y) = (9.10, 7.02)$$

- Measured tune

$$(\nu_x,\ \nu_y) = (8.83, 6.28)$$

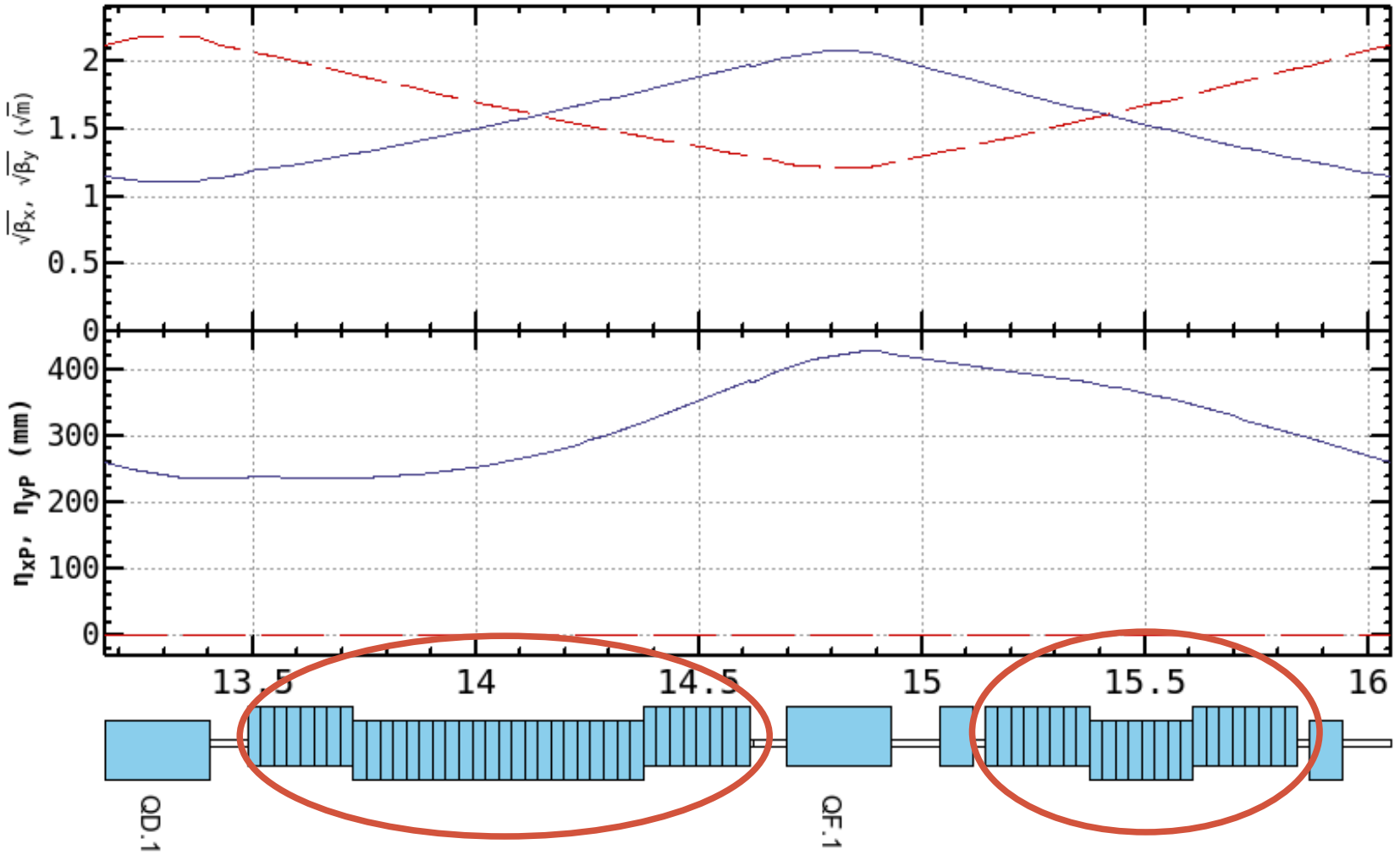
- Tune difference

$$(\Delta\nu_x,\ \Delta\nu_y) = (-0.27, -0.74)$$

- Unbalance between horizontal and vertical directions.

Multi Slice Modeling of Bend Magnet

- DR bending magnet has large saggita
- Modeled by a series of multipole slices. (MULT element)



Linear Soft-fringe in SAD

Thanks to D. Zhou and K. Oide

- Three linear soft-fringe parameters, F1, FB1 and FB2
- We thought,

F1	->	Quadrupole and dipole field
FB1	->	Dipole fringe parameter for the entrance
FB2	->	Dipole fringe parameter for the exit

- Actually,

F1	->	Quadrupole fringe ONLY
FB1	->	Dipole fringe at the entrance
FB2	->	Dipole fringe at the exit

- Therefore, the dipole fringe was missing in the model lattice.
- If we put FB1 and FB2 in addition to F1, the model tune changes

$$(\nu_x,\ \nu_y) = (9.10, 7.02) \longrightarrow (\nu_x,\ \nu_y) = (9.10, 6.65)$$

Measured value is $(\nu_x,\ \nu_y) = (8.83, 6.28)$

- More study using the modified lattice will be performed.

Effect on Main Ring IR Modeling

- Interaction region is modeled by a similar multi-slice method
- FB1 and FB2 affect optics because there is a tilted solenoid field.
- Morita-san made estimation

LER (Phase 3 lattice)

$$(\Delta\nu_x,\ \Delta\nu_y) = (-0.00009, -0.002)$$

HER (Phase 3 lattice)

$$(\Delta\nu_x,\ \Delta\nu_y) = (-0.0009, -0.0002)$$

Parameters with Old Model

Parameters		Unit
Energy	1.1	GeV
Circumference	135.498295	m
# of bunch	2	
# of bunch / train	2	
Max. stored current	11	mA
Energy loss per turn	0.0847	MV
Damping time (τ_x / τ_y / τ_z)	11.5 / 11.7 / 5.8	msec
Emittance (ε_x /ε_y / ε_z)	29.7 / 1.5 / 3673	nm
ε_y / ε_x	5	%
ν_x / ν_y / ν_s	8.830 / 6.280 / -0.018	
Energy spread	0.055	%
Bunch length	6.7	mm
Mom. Comp. factor	0.0103	
# of cells	32	
Total RF voltage	1.0	MV
RF frequency	509	MHz

Parameters with Modified Model

Parameters		Unit
Energy	1.1	GeV
Circumference	135.498295	m
# of bunch	2	
# of bunch / train	2	
Max. stored current	11	mA
Energy loss per turn	0.0847	MV
Damping time (τ_x / τ_y / τ_z)	11.5 / 11.7 / 5.8	msec
Emittance (ε_x /ε_y / ε_z)	29.2 / 1.5 / 3630	nm
ε_y / ε_x	5	%
ν_x / ν_y / ν_s	8.830 / 6.280 / -0.018	
Energy spread	0.055	%
Bunch length	6.6	mm
Mom. Comp. factor	0.0100	
# of cells	32	
Total RF voltage	1.0	MV
RF frequency	509	MHz