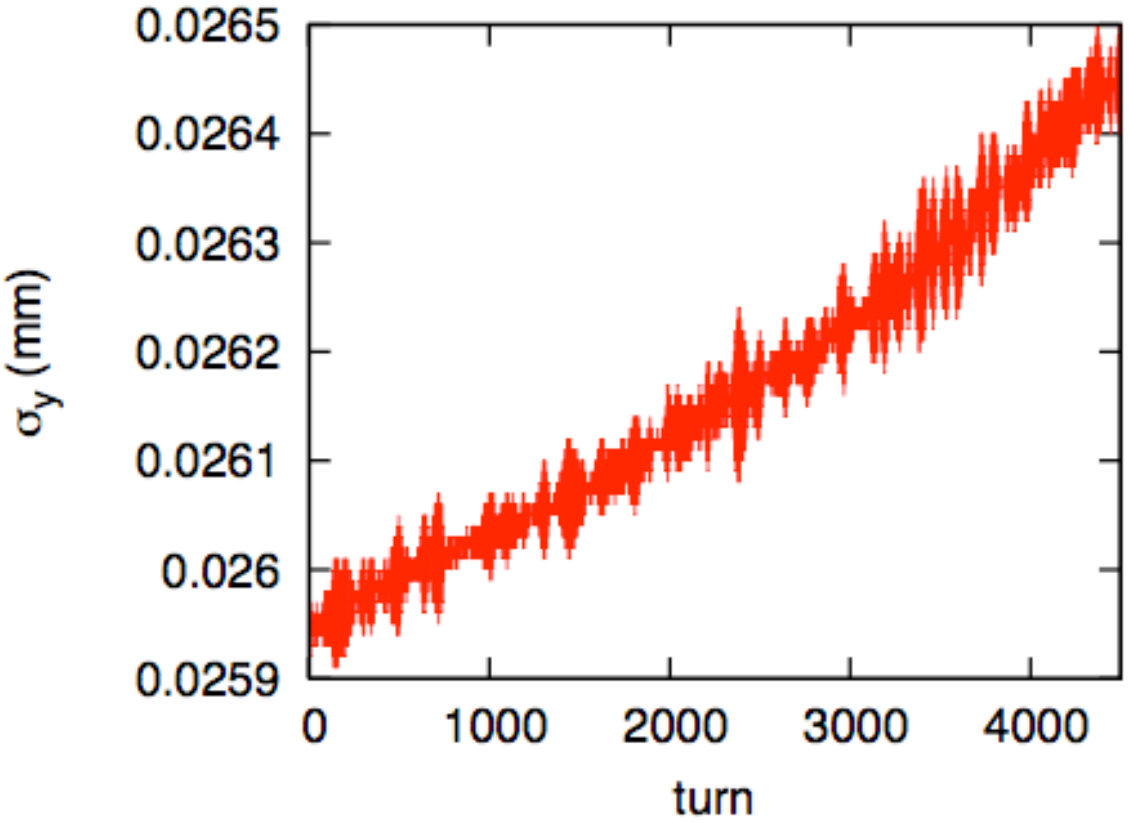
Incoherent effect, CESR simulations, Proposal, workshop

K. Ohmi, H. Jin

KEK

Incoherent emittance growth below the threshold of the fast head-tail

- OCS arc lattice is used for KEKB.
- $\rho_e = 3 \times 10^{10}\ m^{-3}$ ($\rho_{e,th} = 1 \times 10^{11}\ m^{-3}$)



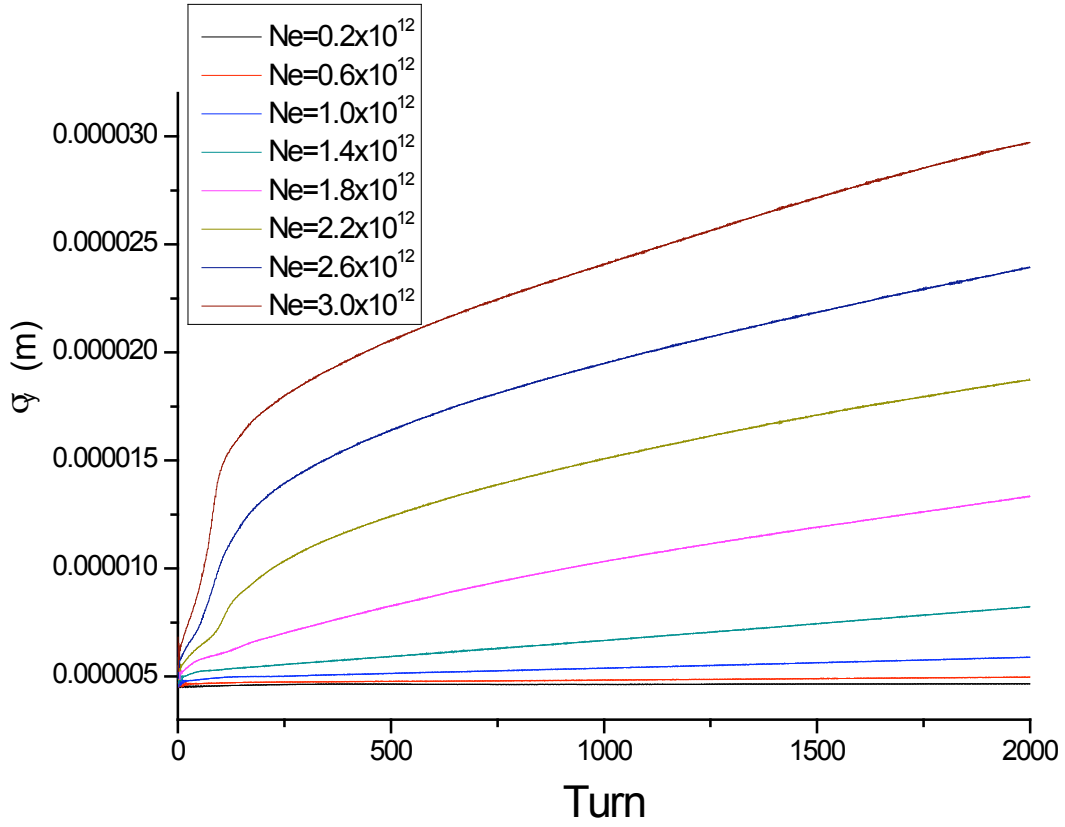
Growth rate is slower than radiation damping rate

- $\Delta\sigma_y/\sigma_y = 5.7 \times 10^{-6} << 1/\tau_y = 2.5 \times 10^{-4}$
- Incoherent effect was negligible for KEKB.

- For high ν_s ring, coherent instability is strongly suppressed. Incoherent effect may be enhanced relatively.
- ->CESR (ν_s =0.098)

Simulation results for CESR (H. Jin)

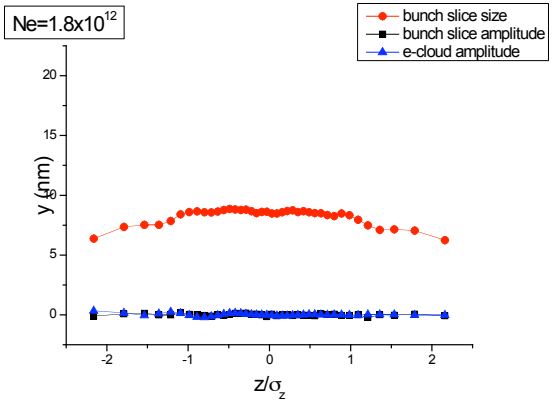
ν_s =0.098

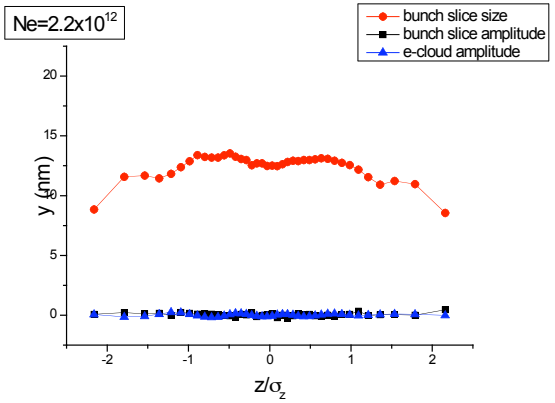


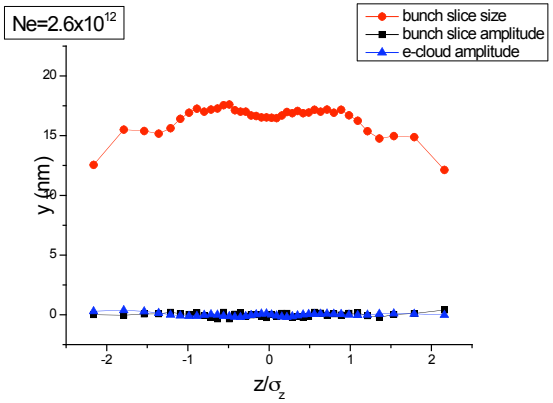
Threshold of e-cloud density seems to be about 1.0e12.

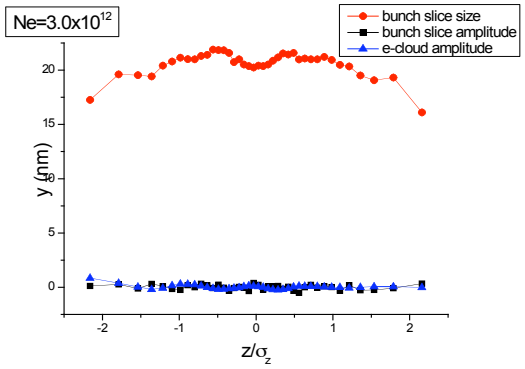
There were no coherent motion. Only beam size increases

Bunch profiles of beam particles and e-cloud 2









Preliminary summary for CESR simulations

- This simulation is done for 10 kicks with uniform beta function, therefore the incoherent emittance growth is unphysical.
- This lattice model shows emittance growth for $1x10^{12}$ m^{-3} is comparable with radiation damping rate. (The value can be a tentative value though the result is unphysical.)
- Lattice information is included now.

* Analytic theory predict the threshold $3x10^{12}$ m^{-3}.

** Tune shift is 0.0055 for $1x10^{12}$ m^{-3}.

*** ν_s =0.098

Schedule for study proposal

- Next Meeting, October…
- Next speakers ….

- I ask contributors to write a proposal each subject.
- The deadline is Nov 30?

- Edit and complete until end of December.

Subjects

Table 1. To complete the proposal for feasibility of using KEKB with small emittances for ILC studies, further studies needed:

Study:	By
Estimate effects at > 0 A: Space-Charge, Tousheck, Intrabeam scattering	Oide
Estimate dynamic aperture	Ohnishi Koiso
Low emittance tuning: further characterization	Koiso Kikuchi Morita
Instrumentation: BPMs, beam size monitors, bunch-by-bunch feed-back system	Fukuma, Flanagan Tobiyama
Characterize electron cloud build-up and instability in LER	Ohmi
Characterize ion instability in HER	Fukuma
Include plans for electron cloud: ILC small aperture chamber	Suetsugu Pivi Kato
Vibration and stabilization	Masuzawa

More contributions are welcome.

Damping ring workshop at KEK

- 18-20 December at KEK
- Organization starts from October.