Brief Report of Vancouver Workshop for Accelerator Physics Group meeting

200608 K. Kubo

ILC GDE meeting, Vancouver

- Main topic is Cost
  - We (Accelerator Physics Group) were (almost) not involved.
  - Cost Estimation
  - Possible cost reduction
- (Possible) design change proposals
  - 2 e+ Damping Rings → 1 Ring
  - Crossing angle at IP (20/2 → 14/14 mrad)
  - (Undulator based e+ source → Conventional)
  - (Main linac: 2 tunnels → 1 tunnel)
- Any cost numbers have not been open.

APTS Group reports in Plenary sessions

- Report of our Group activity (15 min., K. Kubo)
- Main Linac Emittance Preservation (30 min., J. Smith)

(Basically, same as reported in the group meeting before the workshop.)

Parallel sessions

- Participants: (not accurate) 4~8 US, 1~3 Asia, 0~1 Europe
- RTML (1.5h)
- ML (6h)
- BDS (0.3h)

RTML

- Review by P. Tenenbaum
- Emittance preservation study report by J. Smith

Summary of RTML by P.Tenenbaum

What has been done so far

- Very preliminary investigations of emittance tuning upstream of BC1
  - See how well dispersion and coupling corrections really work
- Use of dispersion knobs in BC1/BC2 to tune out effects of pitched RF cavities

SUMMARY

- Emittance Growth in RTML is a serious issue
- Neither of the effects studied to date are under control to our satisfaction
- There is a lot of work to be done!

Main Linac

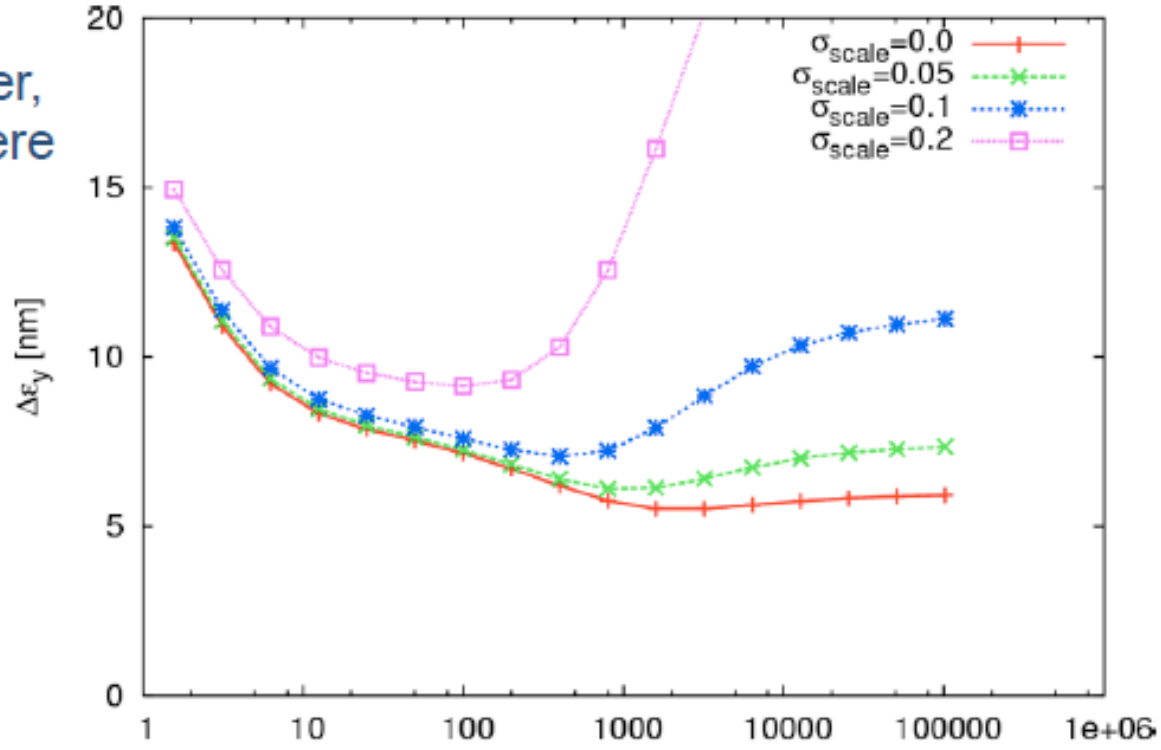
- K. Ranjan
  - Emittance preservation
  - Lattice design of matching sections
- J. Smith
  - Emittance preservation
  - for Plenary talk
- P. Lebrun
  - LET study with CHEF
- R. Jones
  - Mode coupling of long range transverse wakefield

Curved Linac and BPM Scale Errors

P. Eliasson

Plenary: J. Smith

- BPM scale errors: $x_{\text{reading}} = a\, x_{\text{real}}$
- Without calibration, the scale errors could be as large as 20%
- This plot shows the effect the scale error has on DFS performance. A 20% scaling error dramatically decreases DFS performance for a curved linac. However, dispersion bumps were found to mitigate the effects. The horizontal axis is the weighting function for DFS

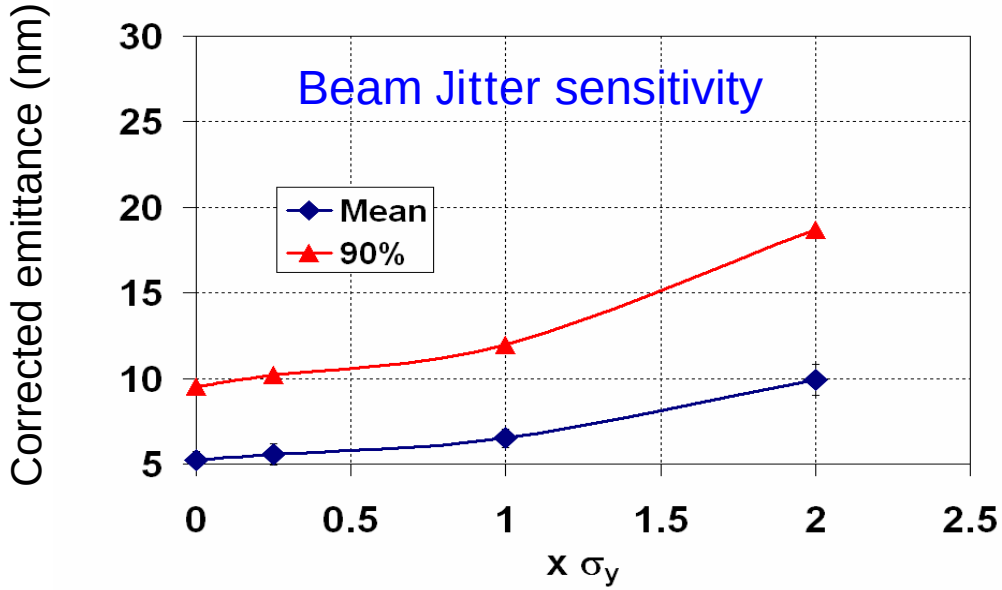


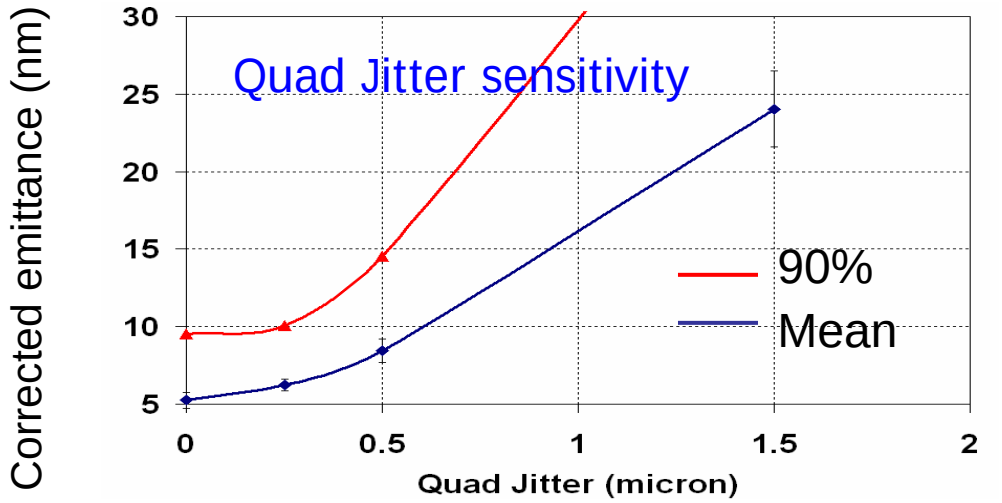
Scale error cannot be less than 20% (M.Ross)

(Need to be confirmed by other people/code. → see K. Ranjan's report Dispersion bumps will cure the problem ?)

DFS: Sensitivity studies

Beam and Quad Jitter Sensitivity





Quad Strength error

Quad strength error (dK)	Mean	90%
0.5 e-3	7.43±0.46	11.7
1e-3	7.44±0.46	11.5
2.5e-3	7.50±0.46	11.5
5e-3	7.70±0.46	11.9

K.Ranjan

(Nice start of dynamic error study.)

BDS: No presentations

Comments from BDS Area Leaders

- Effect of vacuum chamber impedance should be studied
- Performance of post linac intra-pulse feedback should be studied.
  - Required BPM resolution?
  - Optics

Important agreement

- Main Linac static tuning is almost satisfactory for RDR stage
  - exception: need more study on BPM scale errors
- RTML and BDS are much less matured
- We should move from ML static study to dynamic error studies, other areas (RTML, BDS), and LET integrated study.
- Need to discuss including people from Europe
  - no decision in the workshop
- Continue regular video/phone meeting

Some Questions/comments

- Effects of BPM scale error should be studied more.
- Tolerances of misalignment, BPM resolution, etc.. (see next slide.)
  - BPM resolution in Main Linac in BCD (“10 micron or better”) should be changed ?
- Performance of feedbacks should be studied.
- Task list (with person’s names) should be made.

Nominal Misalignment tolerances

Tolerance	Vertical (y) plane
BPM Offset w.r.t. Cryomodule	300 μ m
Quad offset w.r.t. Cryomodule	300 μ m
Quad Rotation w.r.t. Cryomodule	300 μ rad
Cavity Offset w.r.t. Cryomodule	300 μ m
Cryostat Offset w.r.t. Survey Line	200 μ m
Cavity Pitch w.r.t. Cryomodule	300 μ rad
Cryostat Pitch w.r.t. Survey Line	20 μ rad
BPM Resolution	1.0 μ m

K.Ranjan

"Cryostat" and "Cryomudule" are different?
What is Survey Line? (perfect line?)

Do we agree this set as the nominal tolerances?

Do we require 1 μm BPM resolution?