# HINS with 8 ILC-units at 45 mA : misalignment and jitter studies

Jean-Paul Carneiro

Accelerator Physics Department

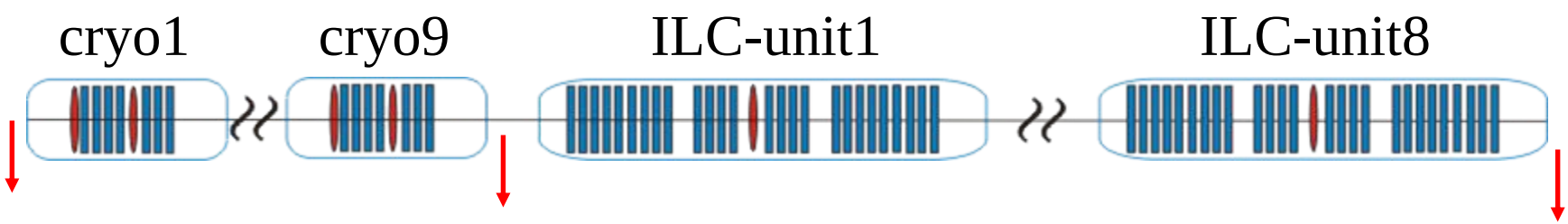
HINS meeting

April 26th 2007

# BETA 1 SECTION : NEW DESIGN WITH 8 ILC-UNITS

9 CRYOMODULES
2 quads/cryo.
8 cavities/cryo.
31.5 MV/m

8 ILC UNITS
1 ILC-unit = 3 cryomodules
9 cavities – 8cavities + 1quad – 9 cavities
1 quad / ILC-unit
ILC-unit 1 to 4 : 18.5 MV/m
ILC-unit 5 to 8 : 31.5 MV/m

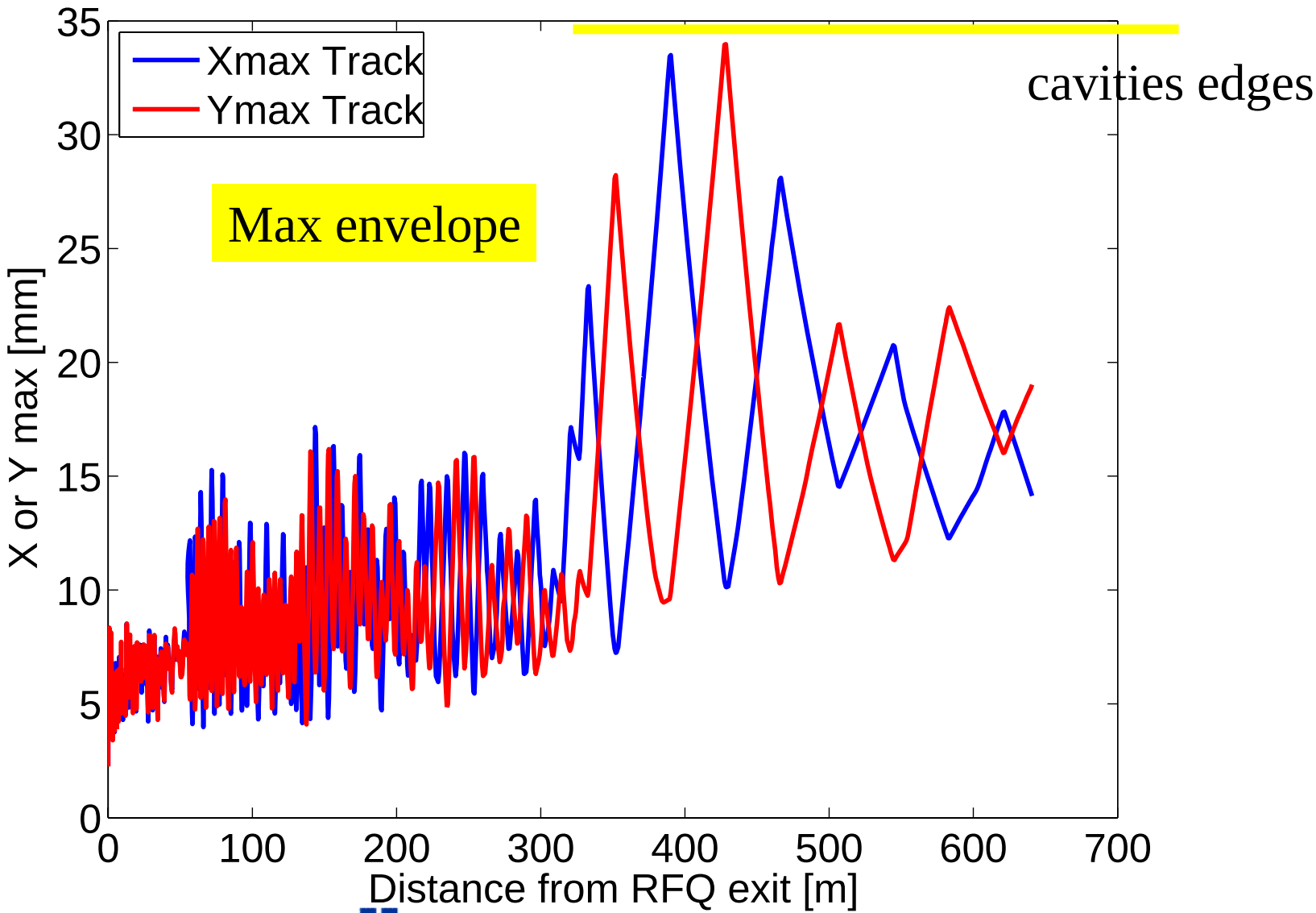



From S-ILC section
~222 m
~1.2 GeV

~330 m
~2.8 GeV

~640 m
~8.0 GeV

# *NO ERRORS : NO LOSSES (optics from 29-Mar-07)*



# MISALIGMENT + JITTER STUDIES

- ***TRACK simulations, 45 mA, 200kp, JAZZ cluster, ANL, 25 seeds***

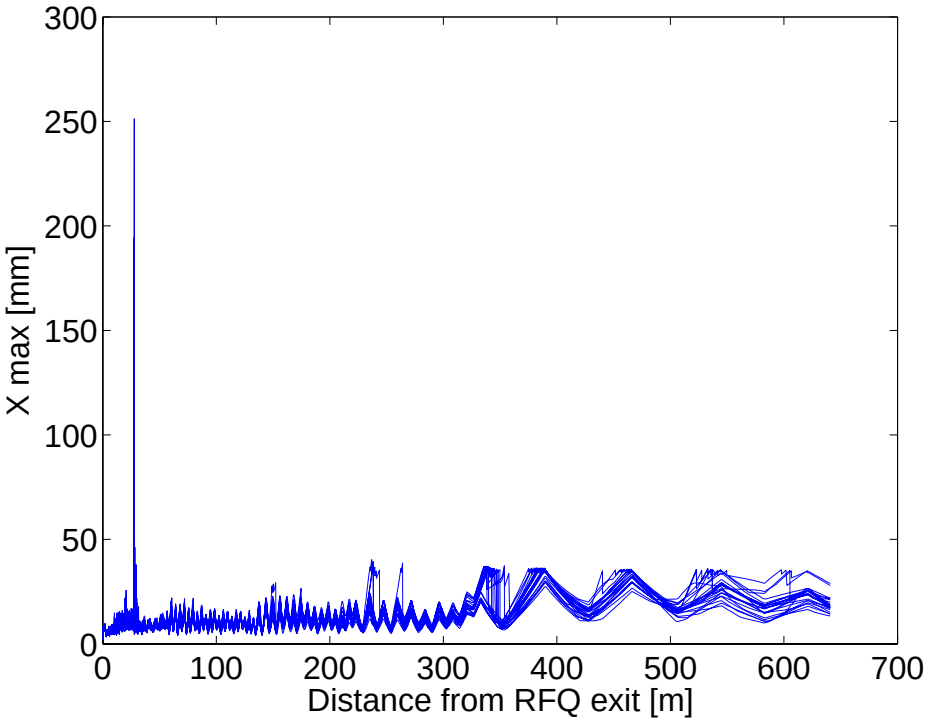
P. Ostroumov, linac06, TUP072
Beam dynamics studies of the 8 GeV super. H- linac

Table 3: Typical Values of Misalignment and RF Errors

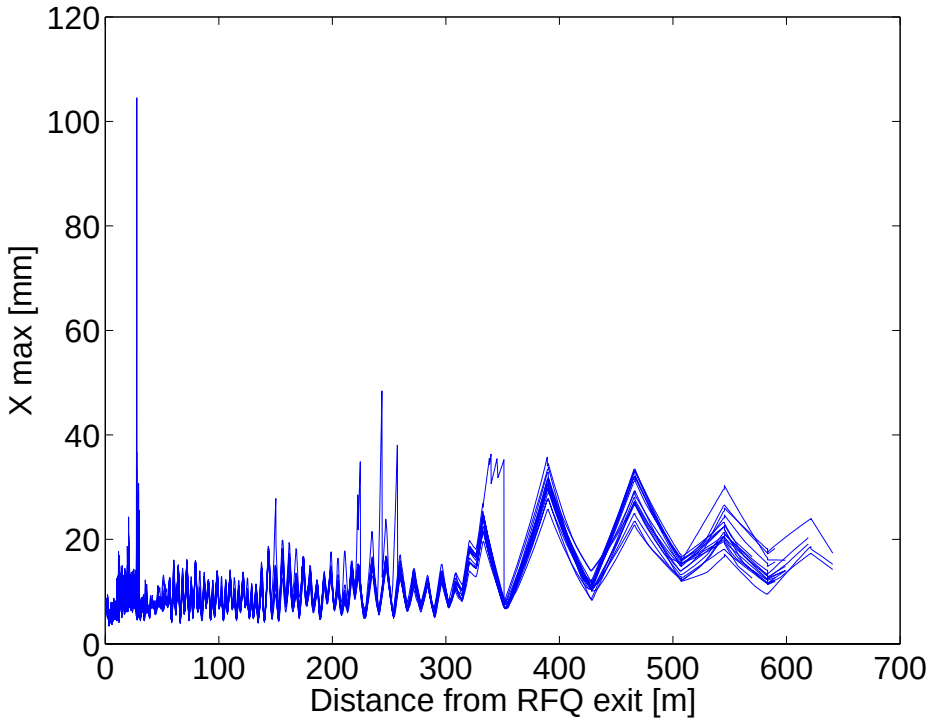
| Error | Value | Distr. |
|---|---|---|
| Cav. end displacement<br>RT and SC spoke cav.<br>SC elliptical cav. | <br>0.5 mm (max)<br>1.0 mm (max) | Uniform |
| Sol. end displacement<br>Type 1 (18 cm long)<br>Type 1 (32 cm long) | <br>0.15mm (max)<br>0.2 mm (max) | Uniform |
| Quad. end displacement | 0.15mm (max) | Uniform |
| Quad. rotation (z-axis) | 5 mrad (max) | Uniform |
| Cav. field jitter error | 0.5 % (rms) | Gaussian |
| Cav. phase jitter error | 0.5°(rms) | Gaussian |

# BETA 1 SECTION : MISALIGNEMENT + JITTER STUDIES

errors + NO correctors

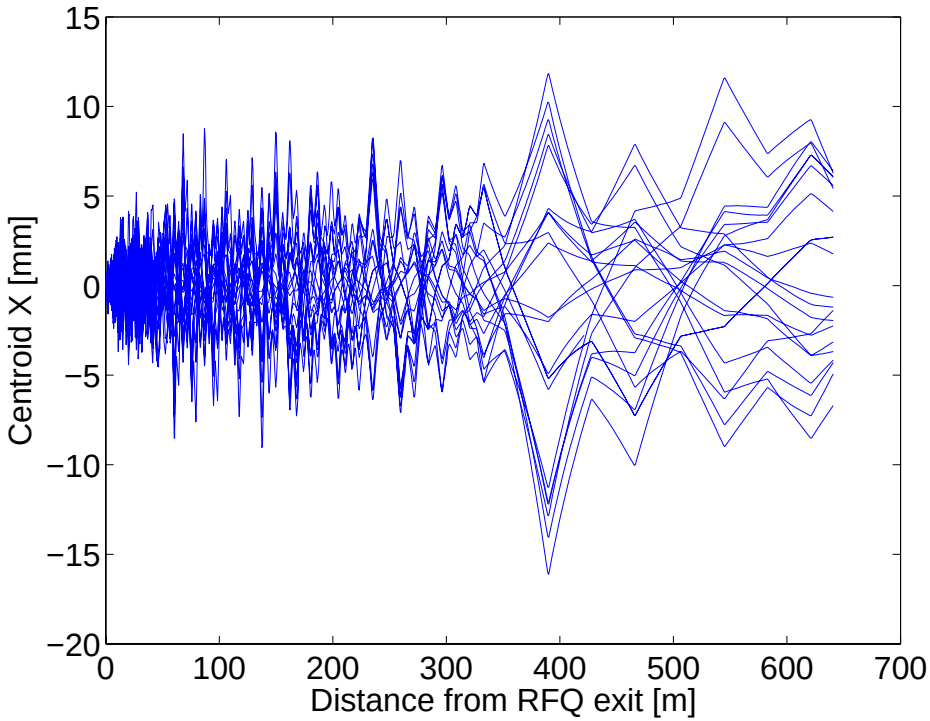



errors + 18 correctors

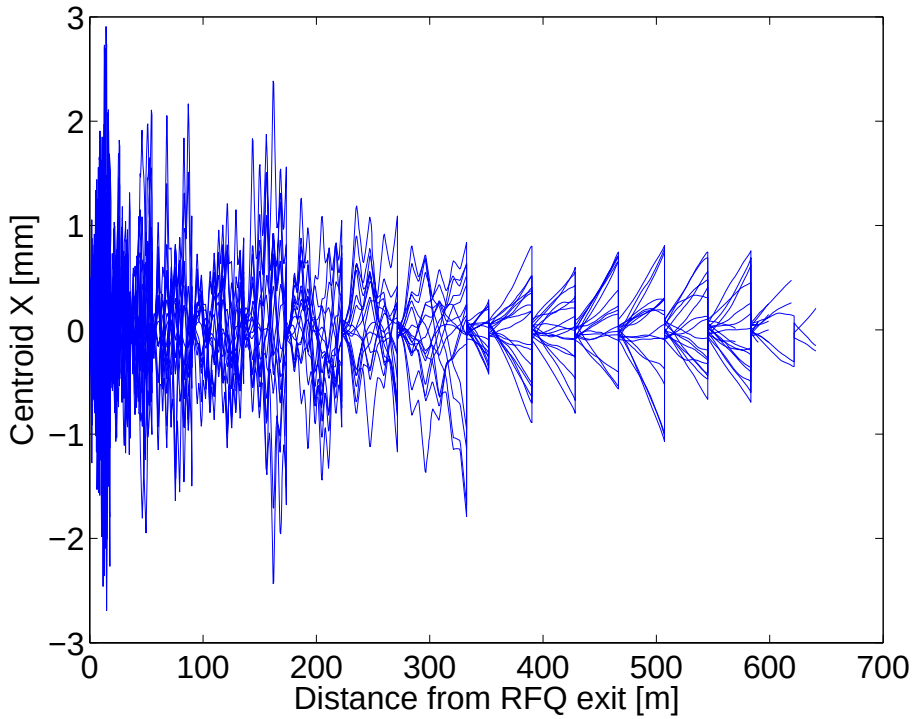


# BETA 1 SECTION : MISALIGNEMENT + JITTER STUDIES

errors + no correctors



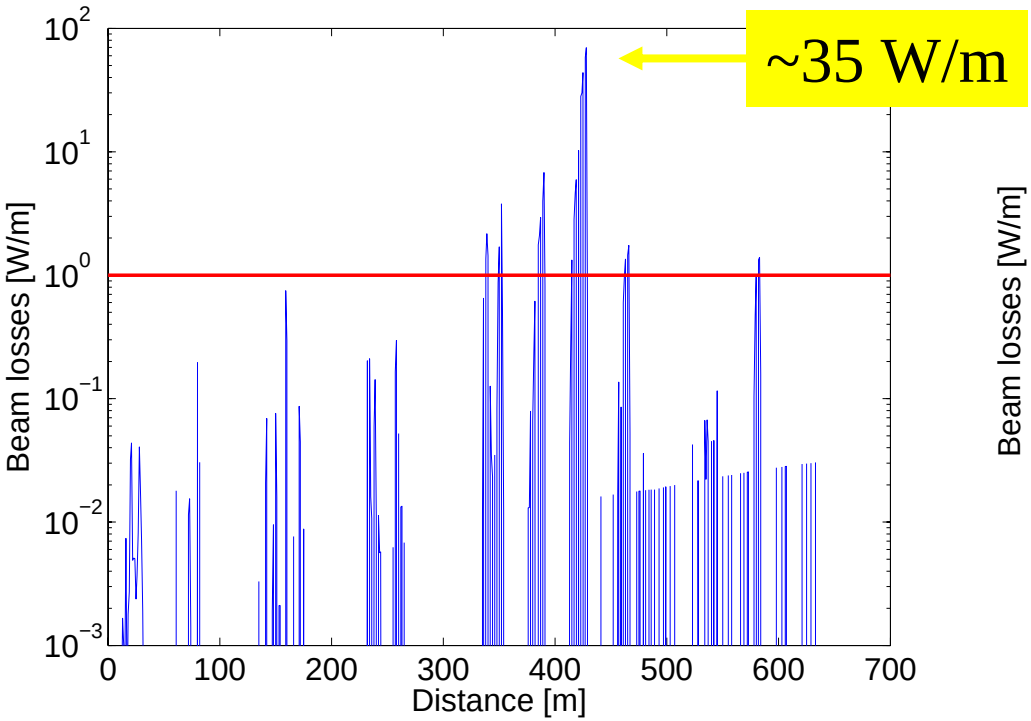

errors + 18 correctors

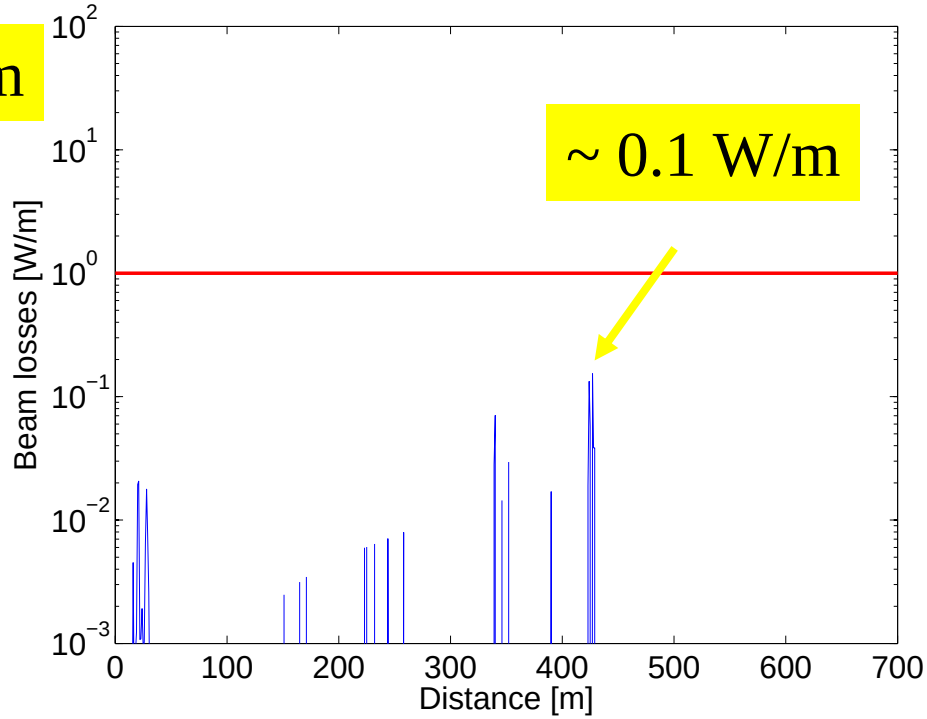


# BETA 1 SECTION : MISALIGNEMENT + JITTER STUDIES

errors + no correctors
= ~ 35 W/m losses peak

errors + 18 correctors
= ~ 0.1 W/m losses peak



# *BETA 1 SECTION : MISALIGNEMENT + JITTER STUDIES*

- HINS with 8 ILC-units looks OK.

- More studies needed to confirm :
  1/ 100 M particles, 100 seed
  2/ More correctors
  3/ Better locations
  4/ “corr” i.o. “zero” in TRACK

- Requested 50 CPU’s for HINS simulations on fnpcsrv1.fnal.gov