

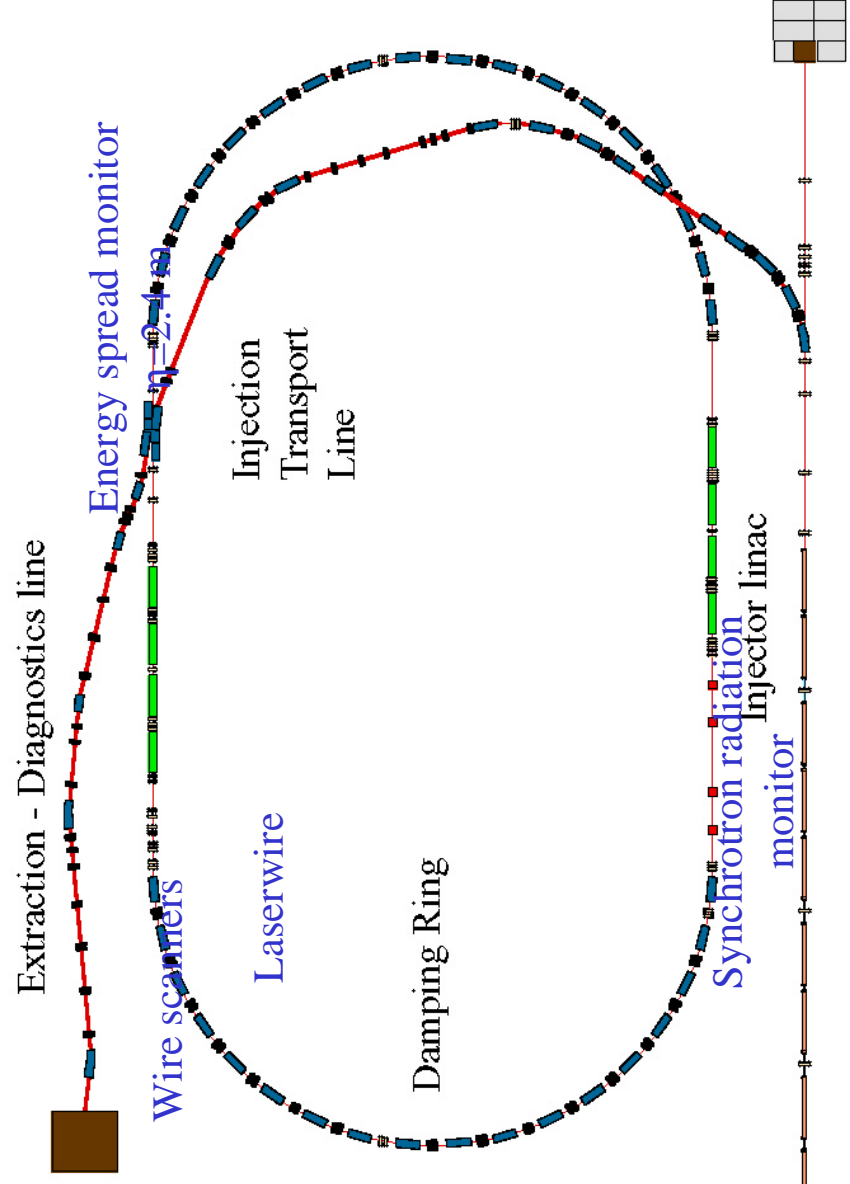
Accelerator Test Facility at

KEK

Linear Collider Damping Ring
Prototype

ATF is the only test facility with ~LC
emittance

Accelerator Test Facility - KEK



Single bunch:
I < 3 mA
(SLC 60 mA)

1.3 GeV
1 x 10¹⁰
1997 ->

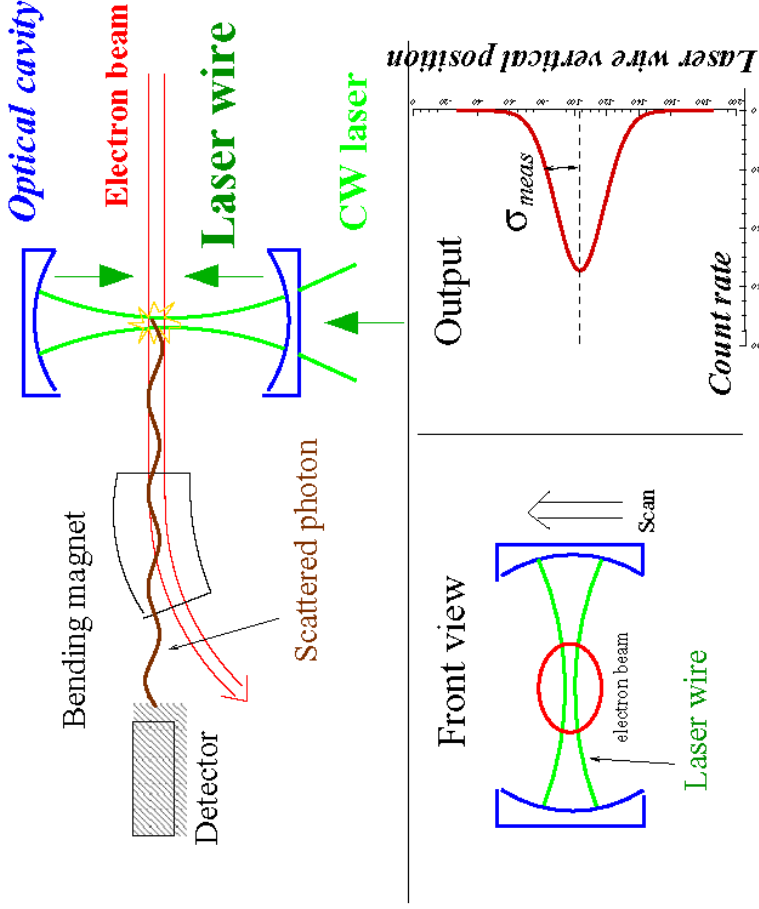
KEKの敷地内に運転中のJLCのための試験加速器

The KEK ATF Damping Ring



Ring laserwire

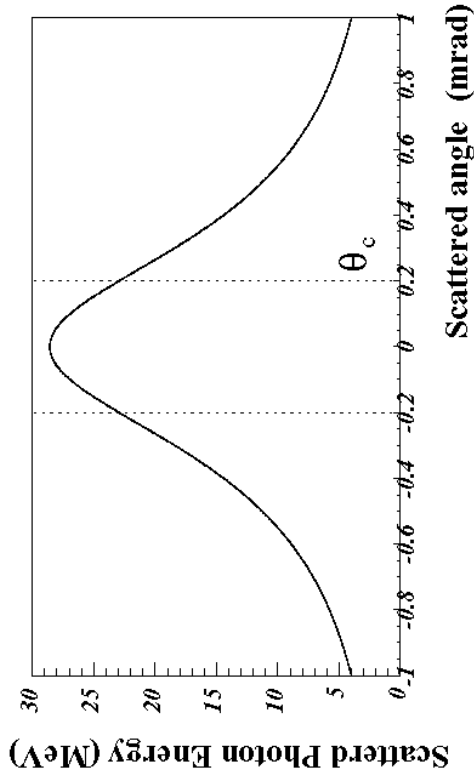
Principle of the laser wire



$$\sigma_{meas} = \sqrt{\sigma_y^2 + \sigma_{lw}^2}$$

Optical cavity realizes (**thin** **intense**) Laser wire

The energy of scattered photon vs the scattered angle



Count rate on Single bunch : N

$$N = \frac{W}{\sqrt{2\pi} h\nu c} \frac{N_e}{\sigma_{meas}} \int_{-\theta_c}^{\theta_c} d\sigma_{compton} d\Omega$$

N_e : Number of electron (10^{10})

σ_{meas} : Measured size ($10\mu m$)

W : Laser intensity ($10W$)

$h\nu$: Laser wave length ($532nm$)

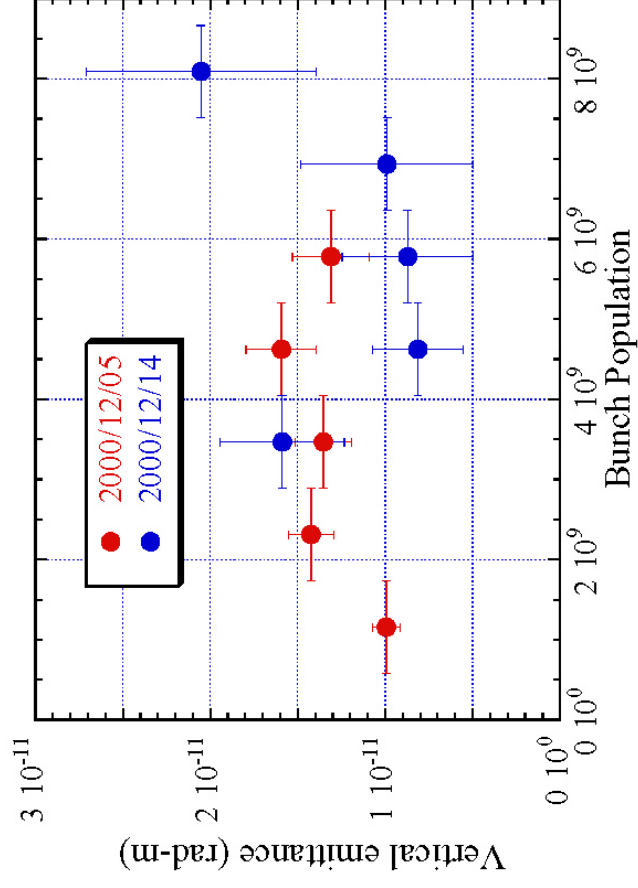
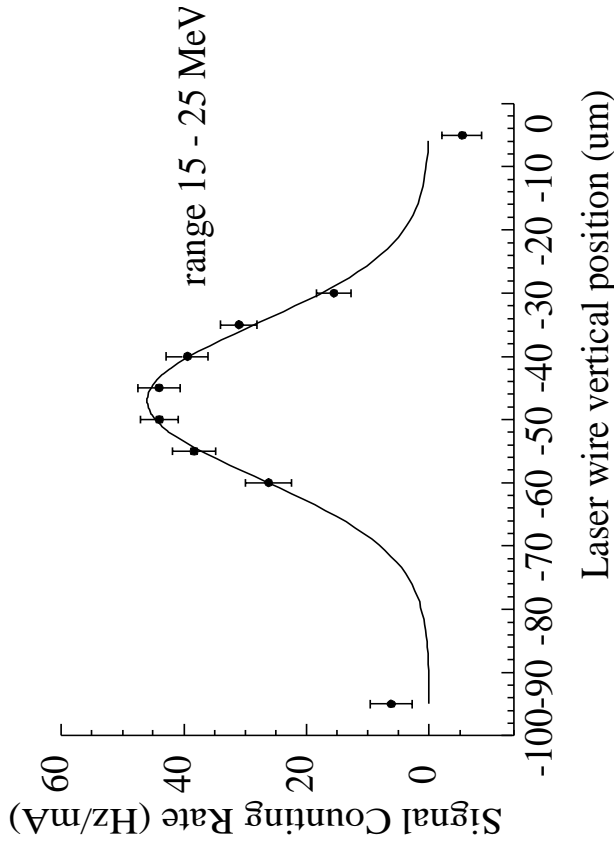
$N = 1kHz$

Written by H.Sakai

One scattered particle per 2000 turns

ATF Ring Laserwire monitor

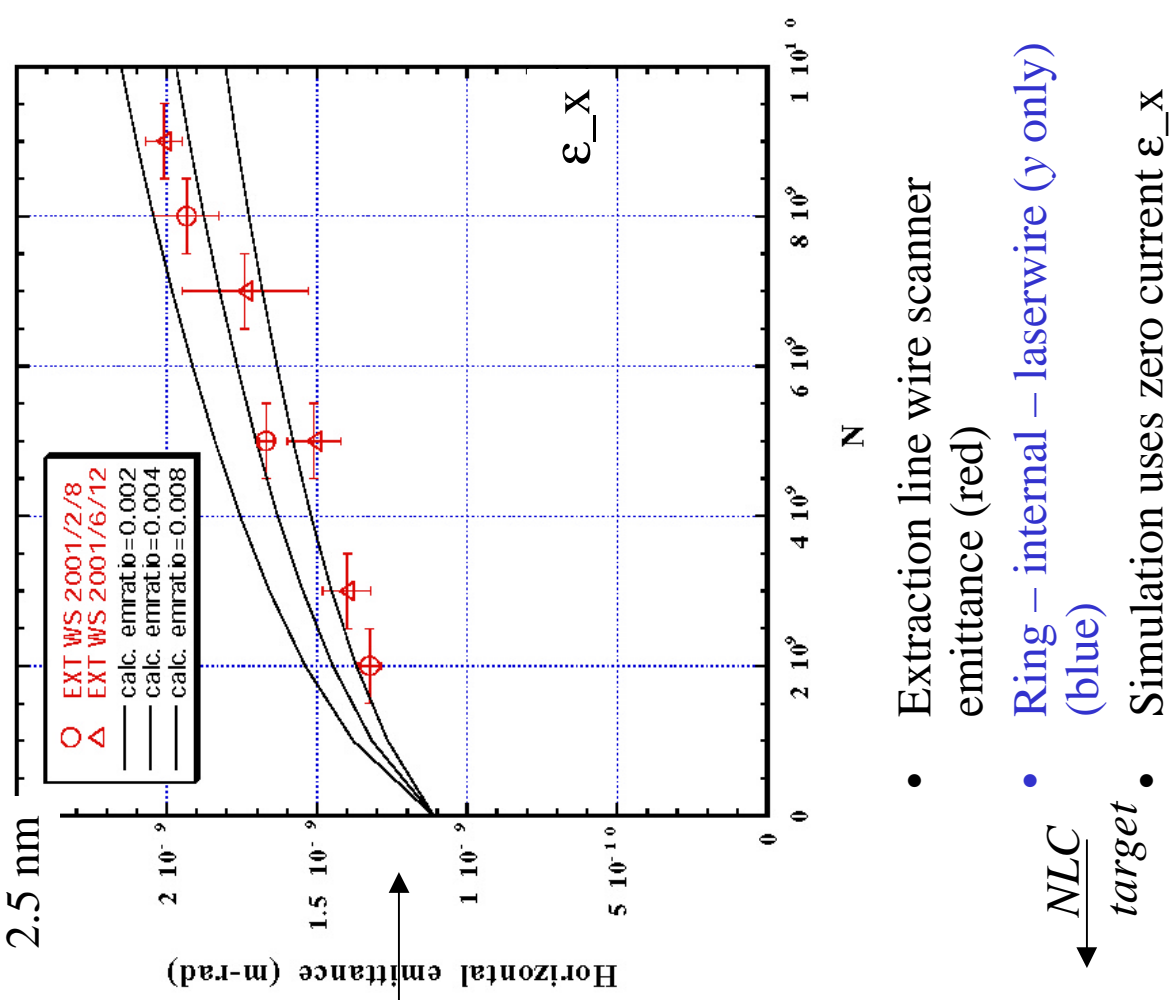
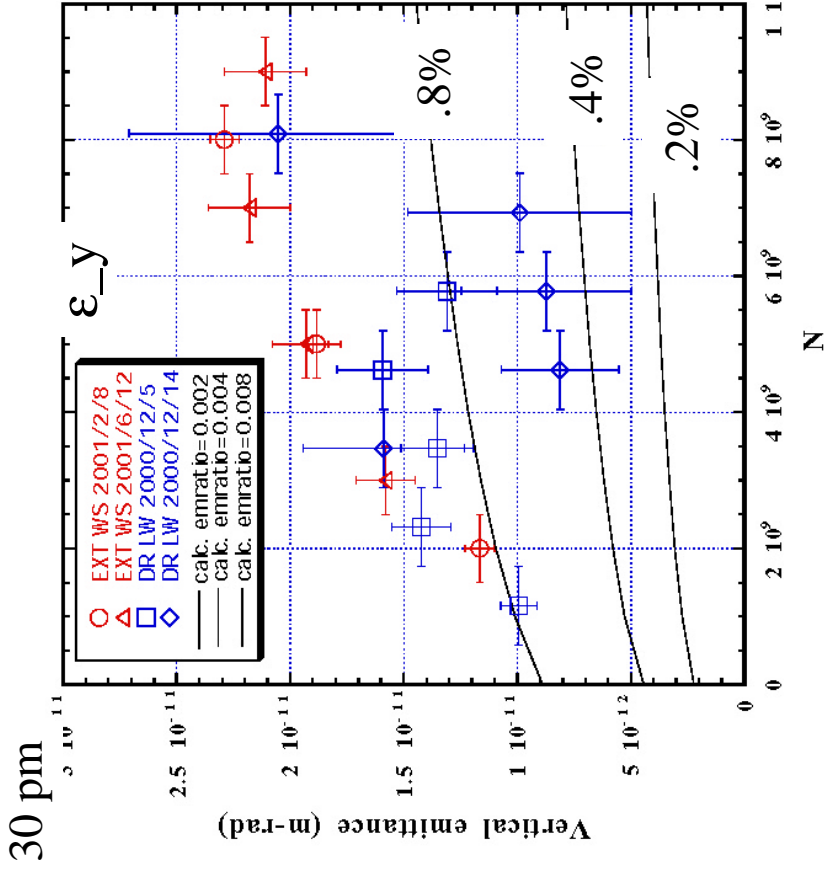
- Resonant cavity close to focus cut-off
 - uses CW laser
 - cavity gain 300
 - measurement ~ 1 hour



Emittance vs intensity

Wire scanner and ring laserwire results

NLC target



- Extraction line wire scanner emittance (red)
- Ring – internal – laserwire (y only) (blue)
- Simulation uses zero current ϵ_x target