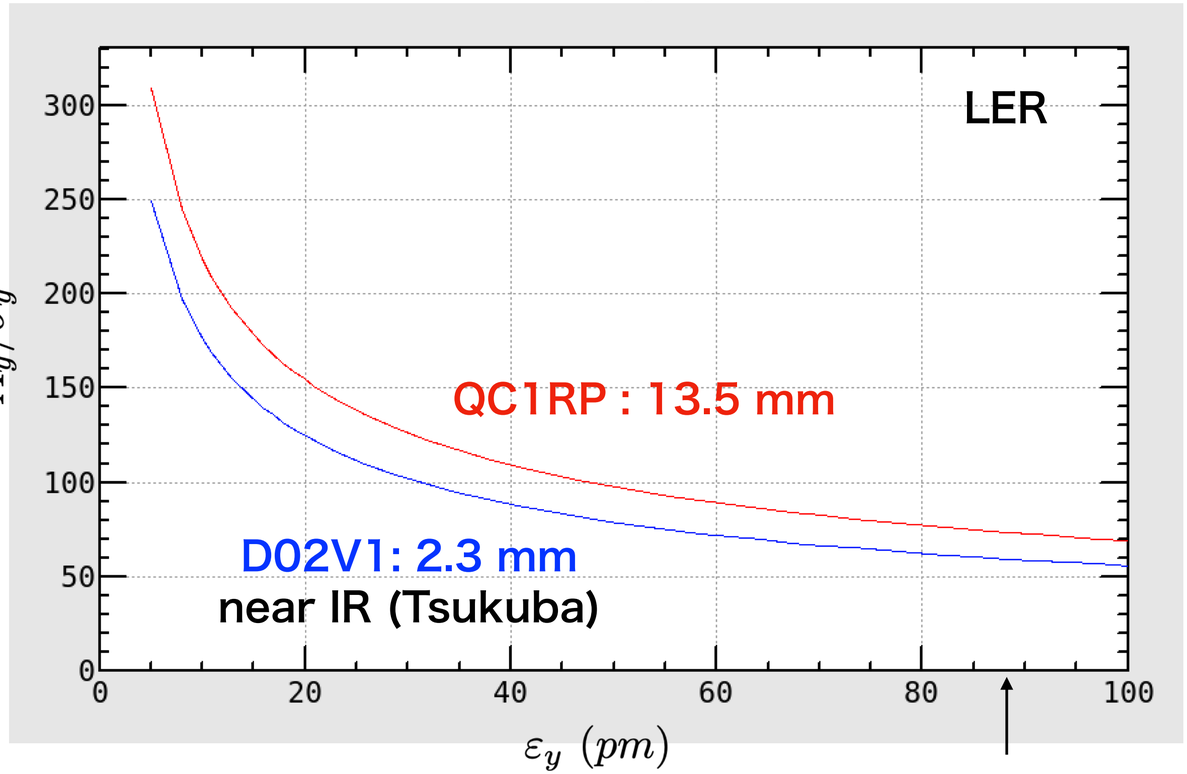
QCS and Collimator Aperture

$\beta_x^* = 80\ mm \quad \beta_y^* = 2\ mm$



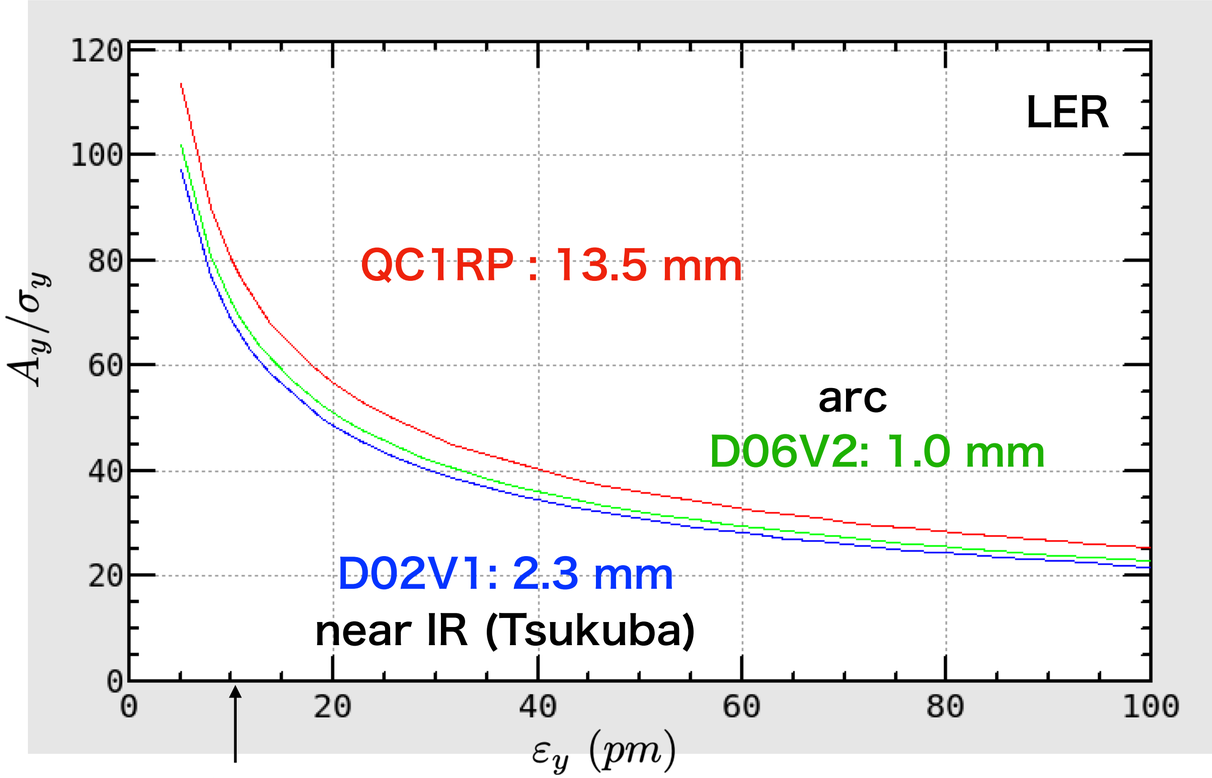
Beam-Beam Blow-up (700 mA/1576)

$\beta_y(D02V1) = 17\ m$

$\beta_y(QC1RP) = 382\ m$

$\beta_y(D06V2) = 19.2\ m$

$\beta_x^* = 32\ mm \quad \beta_y^* = 0.27\ mm$



final design

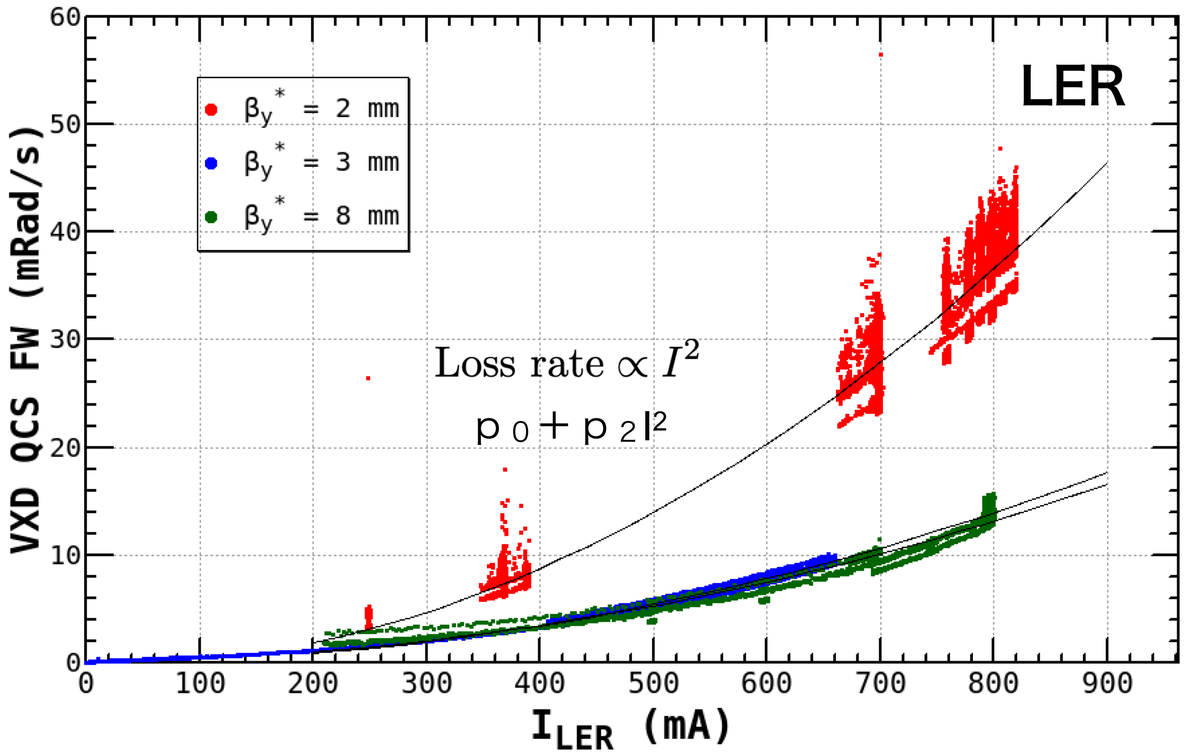
$\beta_y(D02V1) = 111.7\ m$

$\beta_y(QC1RP) = 2830\ m$

Beam-Beam Blow-up reduces the aperture.

The coherent vertical injection error might be problem due to jitters, and so on.

Beam Background



Dose Rate (VXD QCS FW) should be less than 10 mRad/s
in order to tune on CDC HV.

β_y^* = 2 mm with a healthy collimator, D02V1

I_{LER} = 500 mA can be applied.

We can expect L_p = 7-8 x 10^{33} $cm^{-2}s^{-1}$

Beam operation at β_y^* = 2 mm is only for a week
without Belle II detector operation.

When we squeeze the beta at IP less than 2 mm,
the beam background increases.

How to compromise physics run
and the beta squeezing ?

D02V1 collimator apertrue

2.3 mm for β_y^* = 2 mm (after damage, bkg. increases by 20 %.)
2.1 mm for β_y^* = 3 mm (well optimized)
4.5 mm for β_y^* = 8 mm (too large aperture)

Assumption: coulomb scattering

β_y^*	3 mm	2 mm	1 mm
Bkg.	1	1.6	3.7