

Which beam parameters for e-e- ?

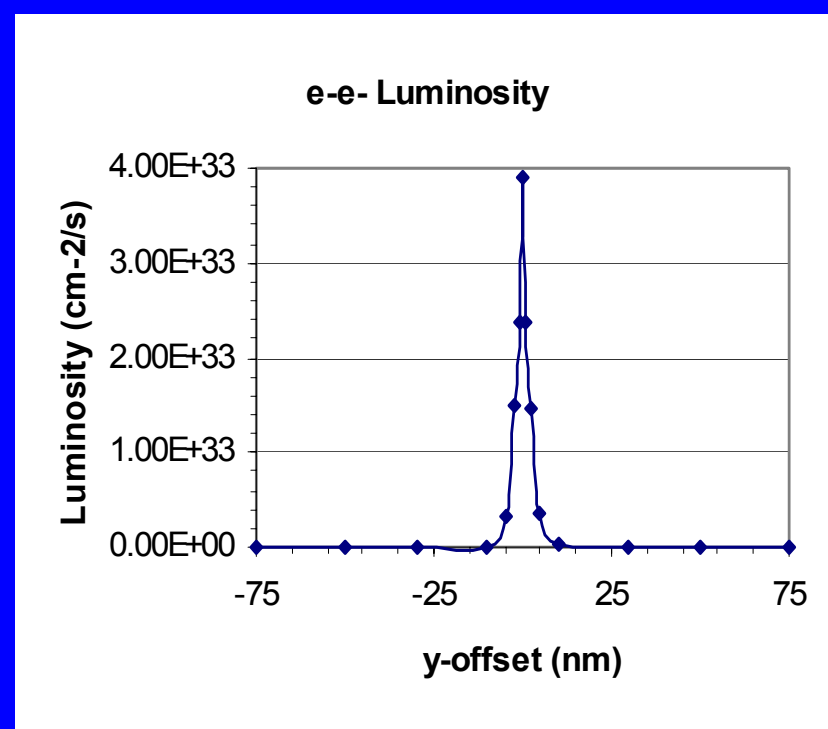
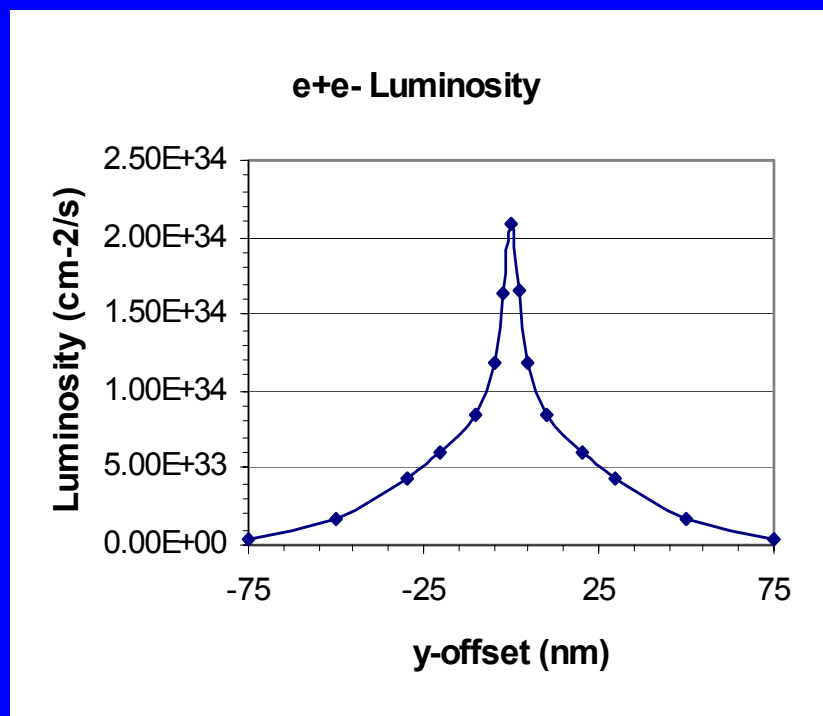
Philip Bambade
LAL-Orsay

Snowmass 2005

Based on work from:

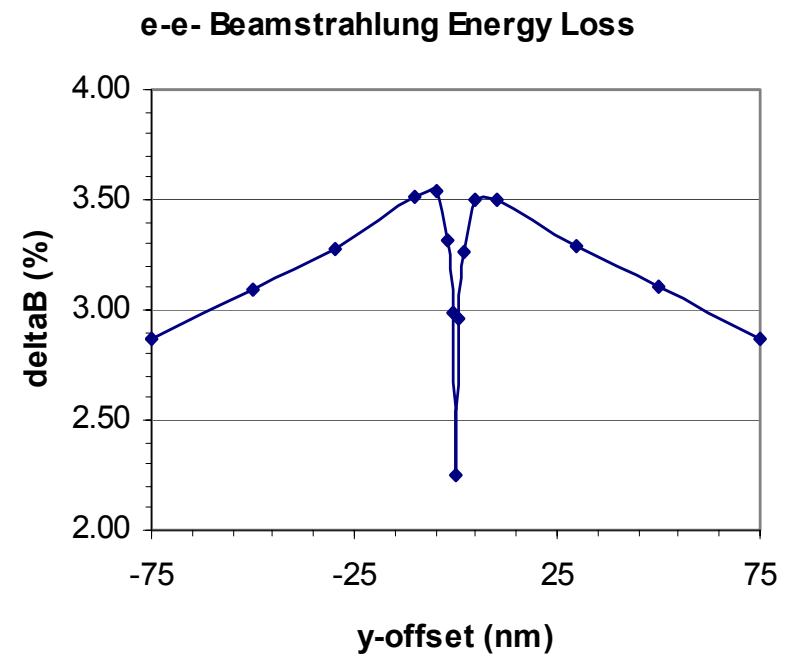
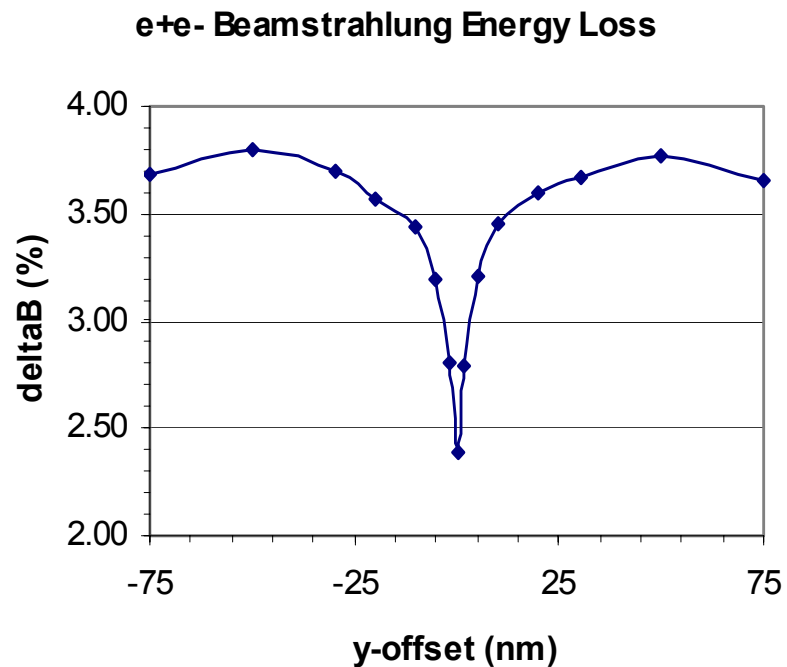
1. Maria Alabau and Angeles Faus-Golfe (U. of Valencia)
2. Andrei Seryi (SLAC)

Present nominal parameters :
e-e- luminosity $\sim 20\%$ of e+e-



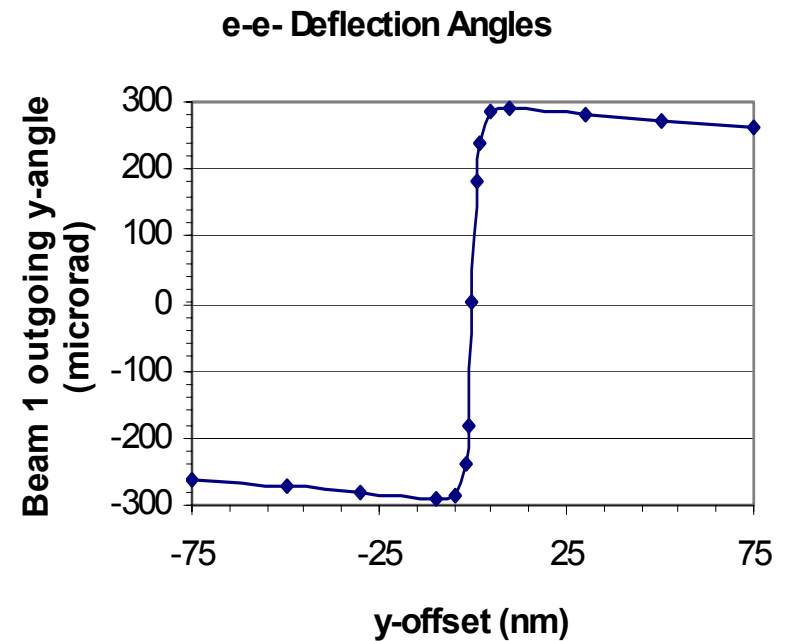
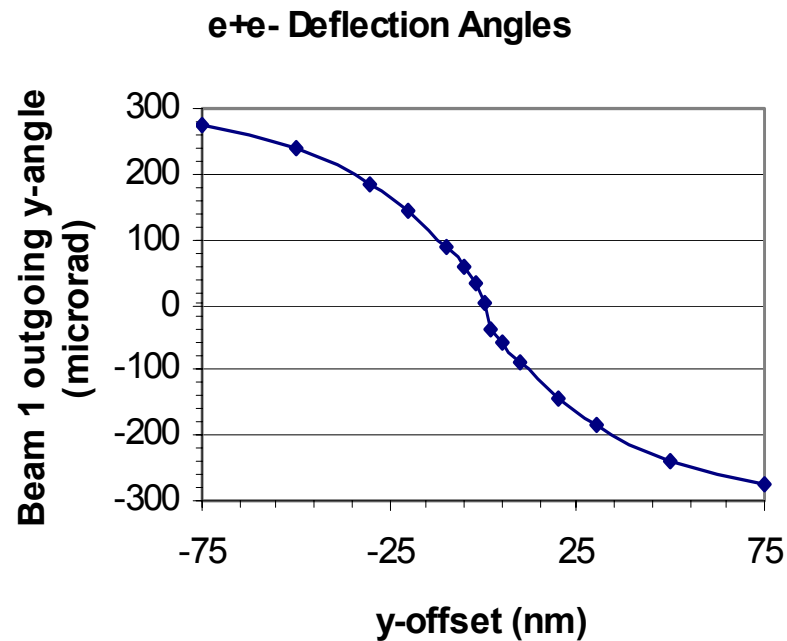
Present nominal parameters :

similar beamstrahlung energy loss

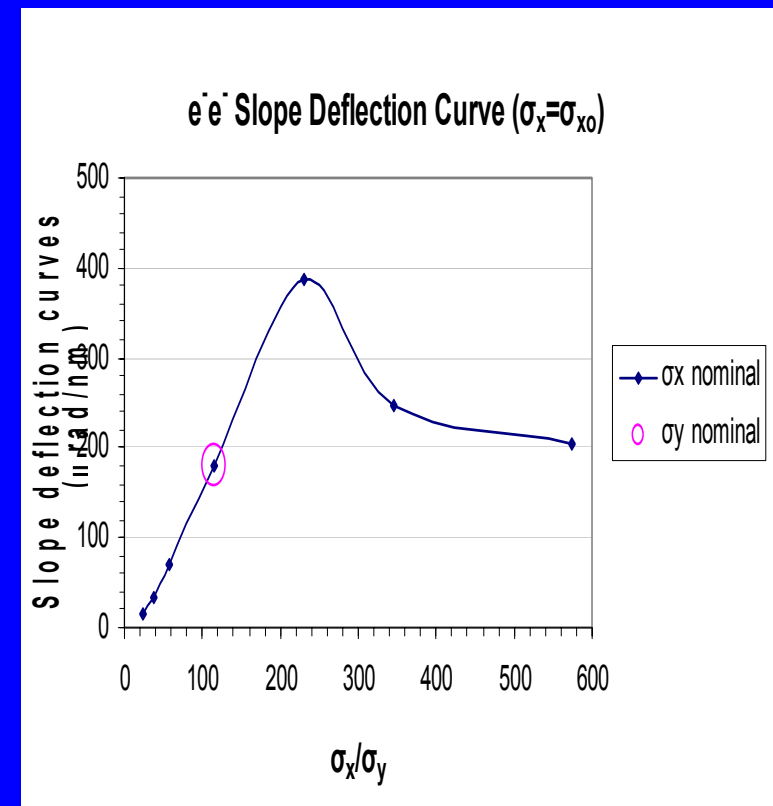
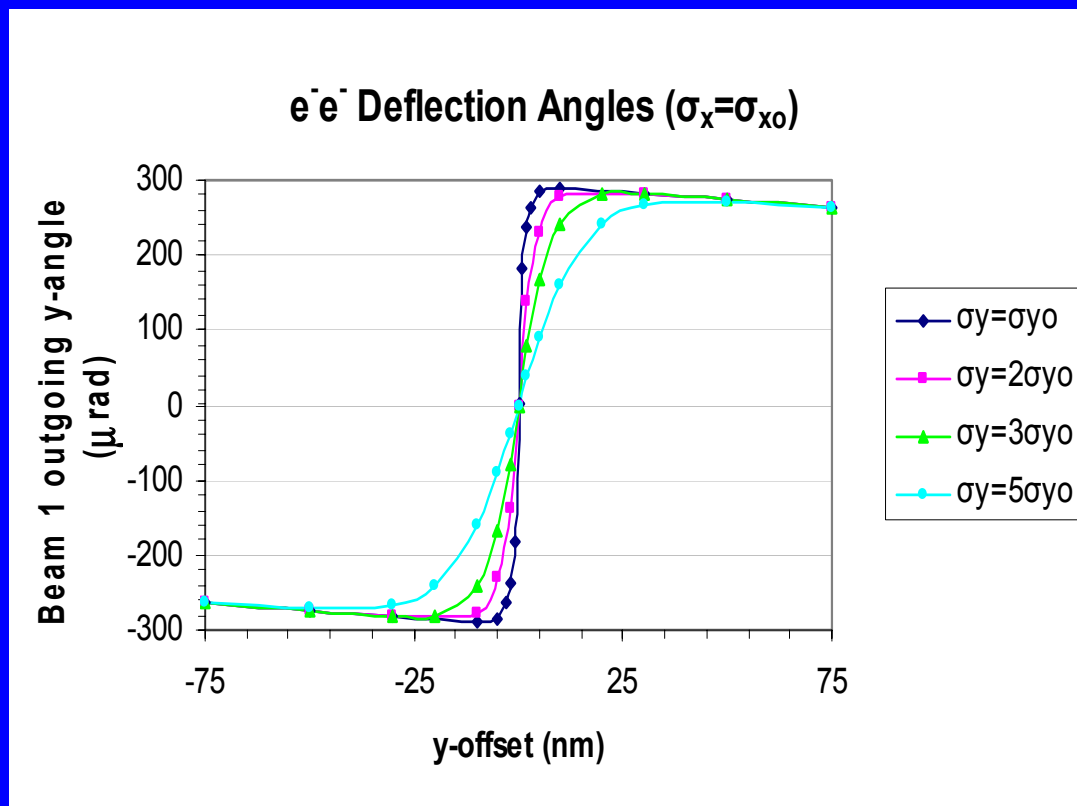


Present nominal parameters :

beam-beam deflection curve

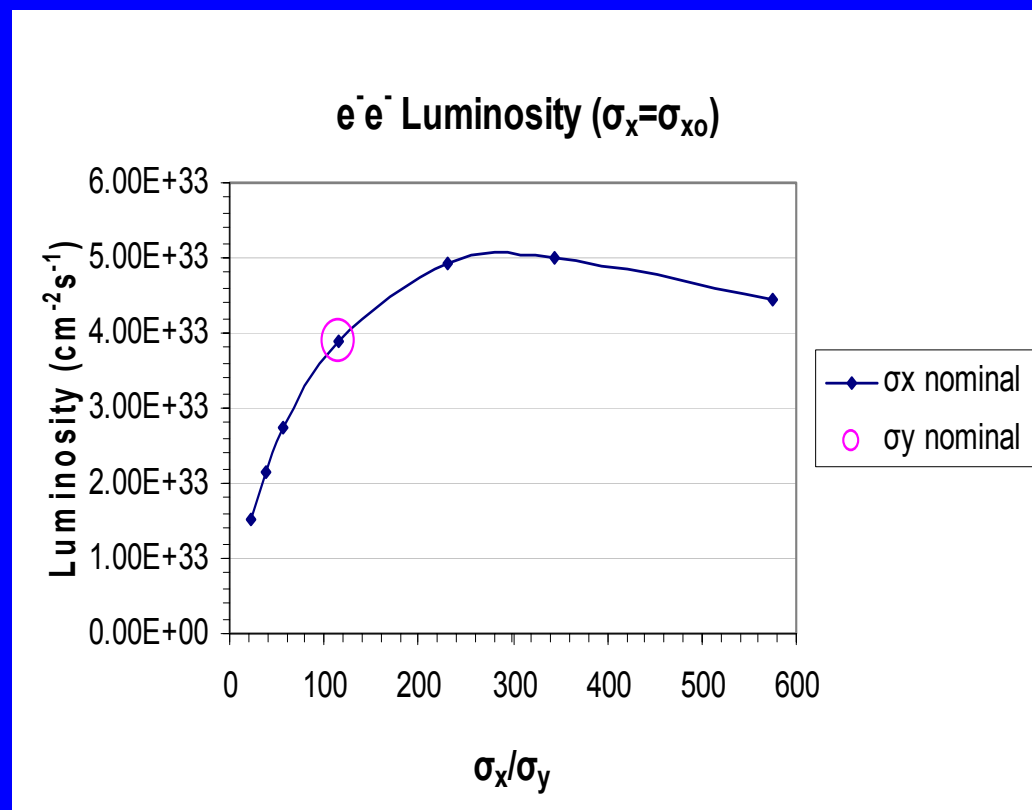
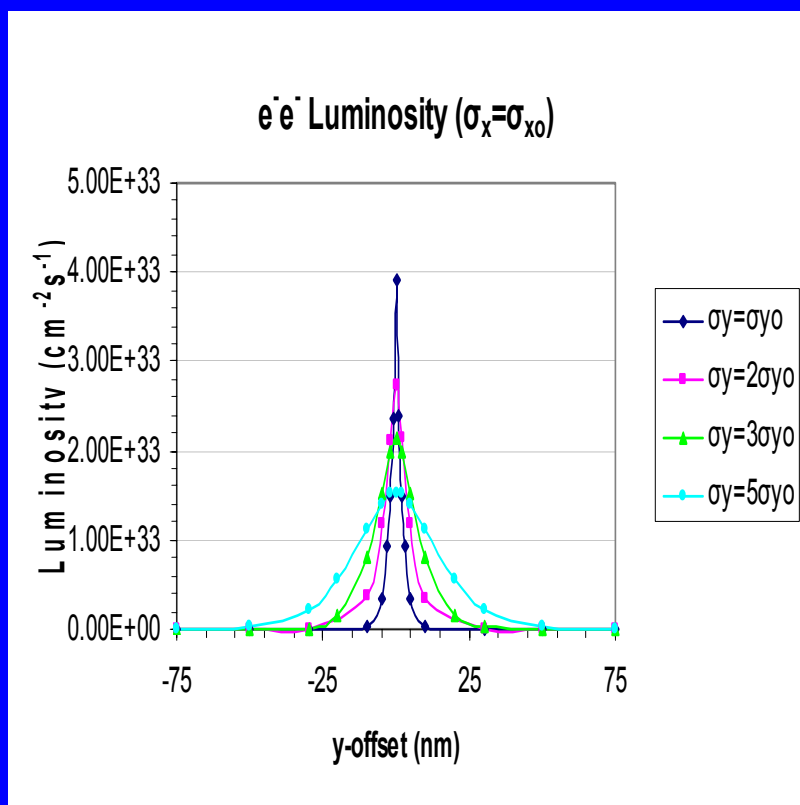


Increase vertical beam size by $\times 5$: better beam-beam deflection curve

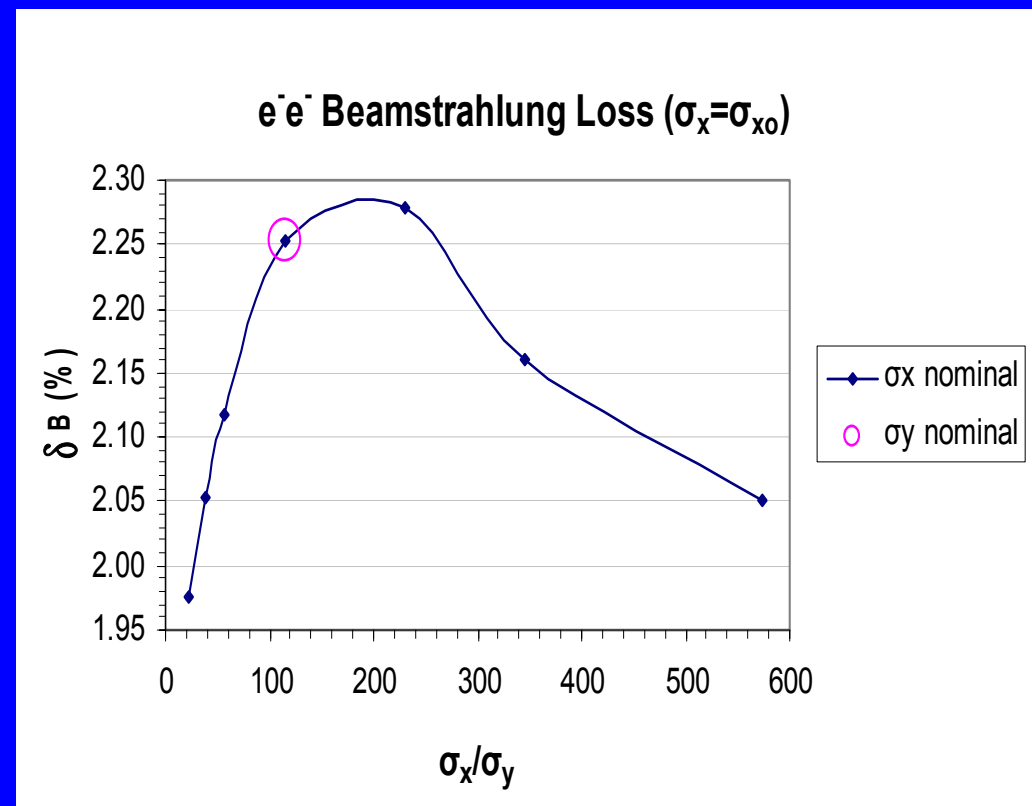
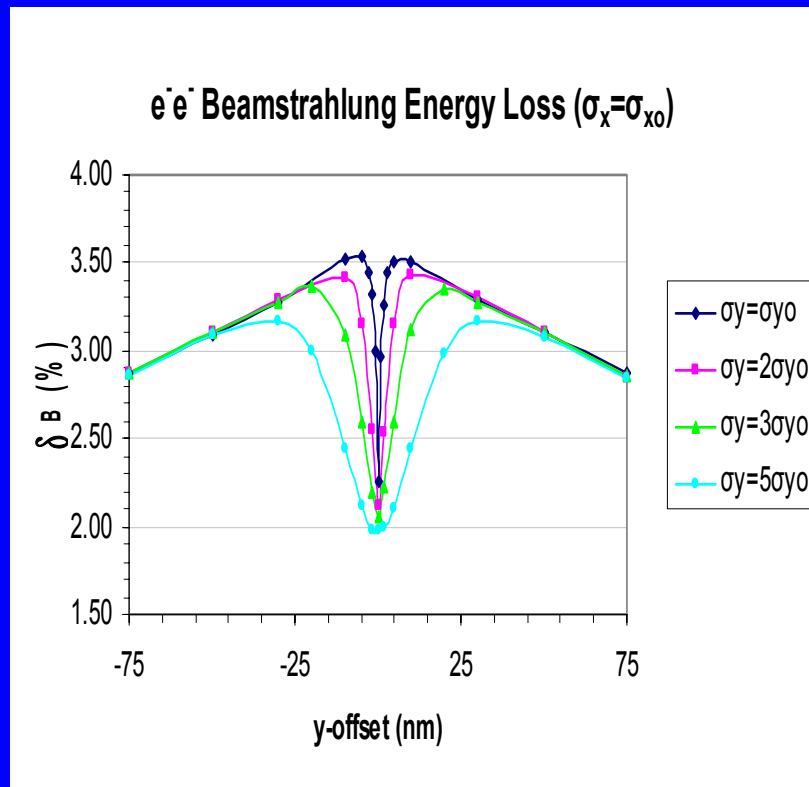


Increase vertical beam size by $\times 5$:

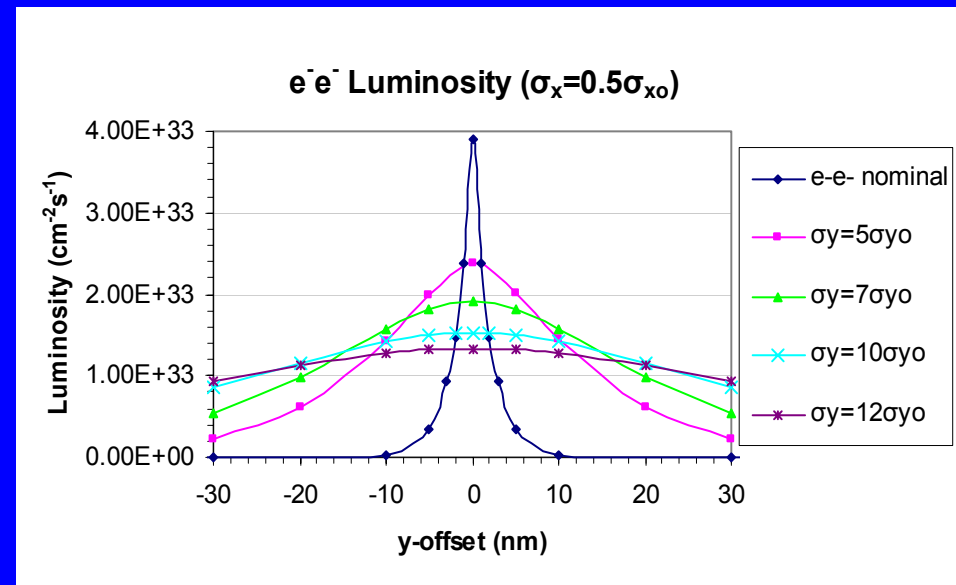
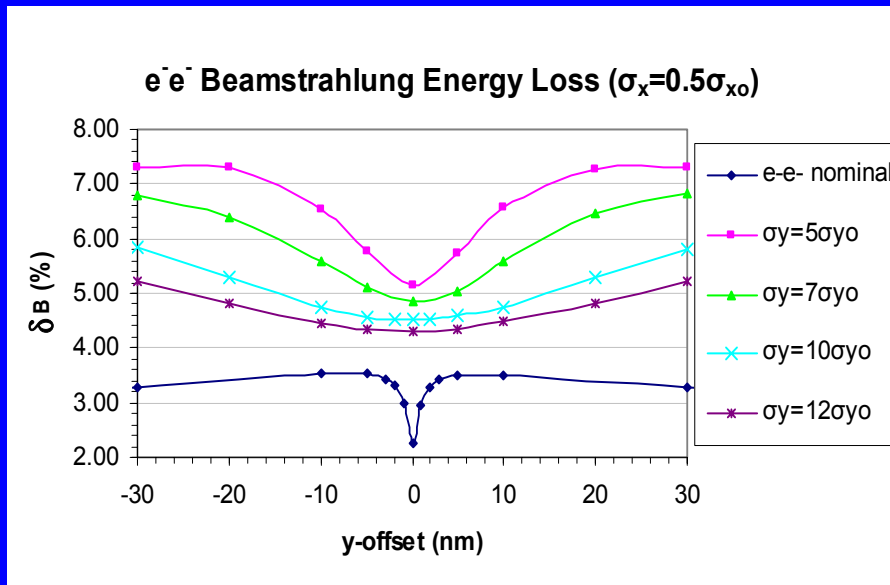
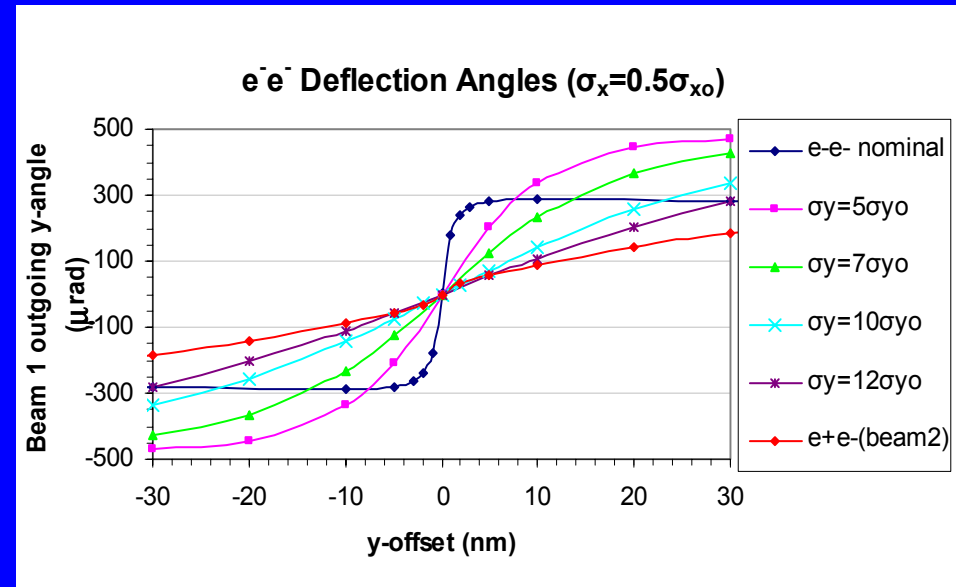
lower luminosity by factor ~ 2



Increase vertical beam size by $\times 5$: similar beamstrahlung energy loss

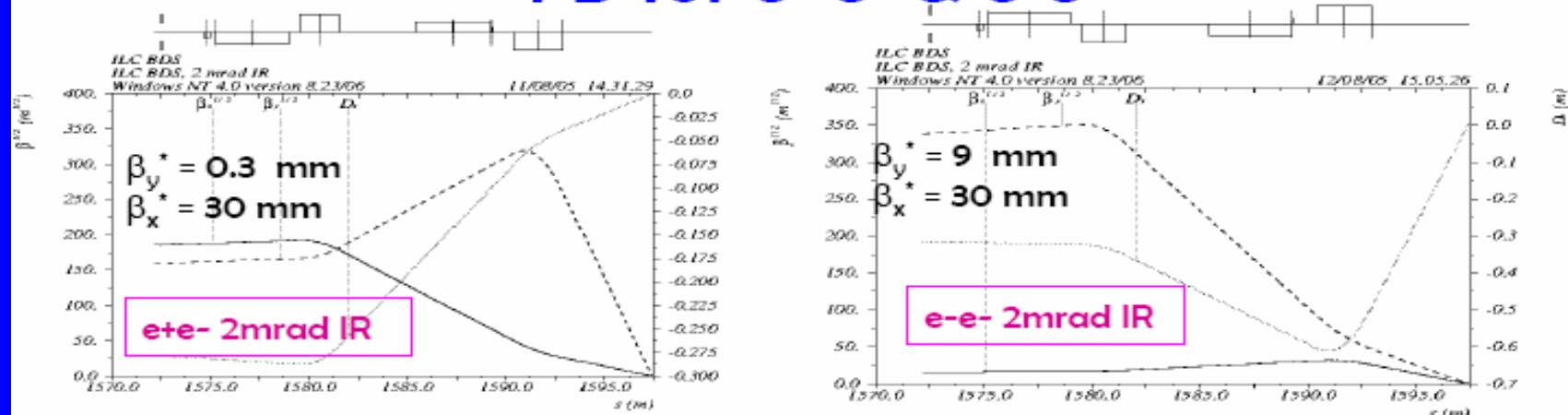


Horizontal size
 $\times 0.5$
 and increased
 vertical sizes



First look at optics in 2 mrad scheme (A. Seryi)

FD for e⁺e⁻ & e⁻e⁻



- From the incoming and extraction optics point of view, e⁻e⁻ in 2mrad IR is feasible
 - Optics constraints require reversing polarity of FD and thus increasing betaY* by about factor of 30
 - The incoming FF optics would require retuning for e⁻e⁻ option
- The ideal e⁻e⁻ luminosity is about 8% of e⁺e⁻
 - The increased Y size also decreases the disruption of e⁻e⁻ collisions
 - Keep X size similar as in e⁺e⁻, to minimize energy tail for extraction
- Increasing increasing Y size is good for feedback and should also be done in 20mrad IR.

ILC workshop, Snowmass, 14 - 27 August 2005

A. Seryi

Conclusions and questions

- e-e- has very sharp beam-beam deflection curve, which makes feedback very difficult
- This steepness can be reduced somewhat with a larger vertical beam size, at the expense of a factor 2 in luminosity
- Even smoother beam-beam deflection curve can be achieved with a reduced horizontal beam size, at the expense of a factor 2 worse beamstrahlung energy spread
- Optics with such (rounder) beams can be achieved both for 20 and 2 mrad schemes (latter is a first look)

→ is it acceptable for physics to be done in e-e- mode
e.g. selectron threshold mass measurement ?