ILC FFS $\sqrt{s} = 500$GeV status

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- Matching using: Matching quads + QD6, QD4, QF3, QD2A, QD2A, QF1, QD0.
- Target: $\beta_x = 0.011$m and $\beta_y = 0.00048$m.

$l^* = 3.50$ m

$\beta_x = 0.01099976171$ m
$\beta_y = 0.0004799986132$ m
$\alpha_x = -0.2009932895$
$\alpha_y = 0.3923269404$
$D_x = 6.658178479 \cdot 10^{-5}$ m
$D_y = 0.0$ m

$l^* = 4.50$ m

$\beta_x = 0.01099999724$ m
$\beta_y = 0.0004799999637$ m
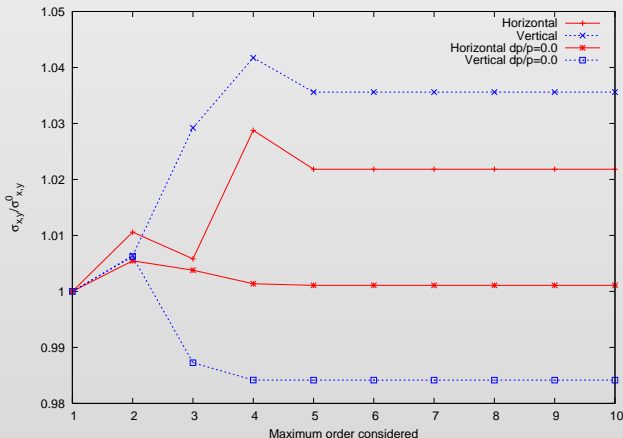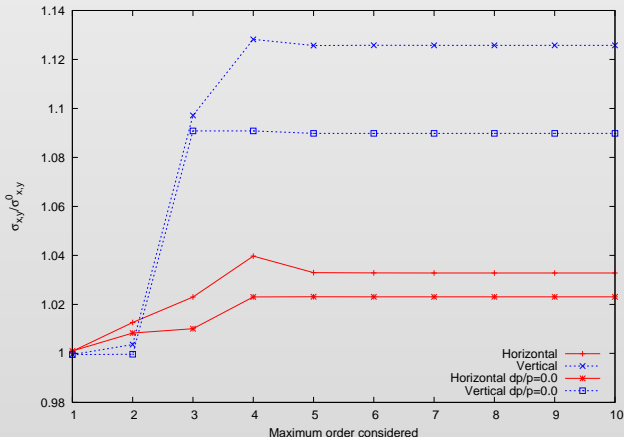$\alpha_x = 0.08804825728$
$\alpha_y = -0.02902843874$
$D_x = 1.080846343 \cdot 10^{-5}$ m
$D_y = 0.0$ m

- Optimization using 5 sextupoles: SF6, SF5, SD4, SF1, SD0.
- Momentum spread: $\Delta p/p = 0.00125$.
- MAPCLASS computation.
- Order 10 beam sizes: $\sigma_x^{10} = 491.92$nm. $\sigma_y^{10} = 6.06$nm.

- Optimization using 5 sextupoles: SF6, SF5, SD4, SF1, SD0.
- Momentum spread: $\Delta p/p = 0.00125$.
- MAPCLASS computation.
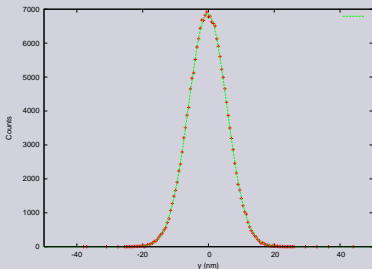- Order 10 beam sizes: $\sigma_x^{10} = 489.50$nm. $\sigma_y^{10} = 6.60$nm.

Tracking

- 200000 particles with synchrotron radiation effects.
- Core beam size calculation from Gaussian fit.
- Negligible SR radiation effect.

$l^\star = 3.50$m

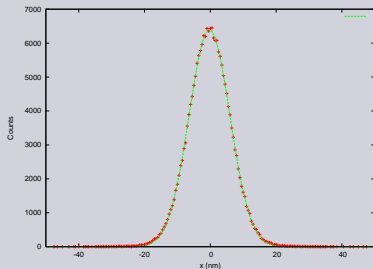$$\sigma_x^{\mathrm{core}} = (476 \pm 1)\mathrm{nm}$$

$$\sigma_y^{\mathrm{core}} = (5.79 \pm 0.02)\mathrm{nm}$$

$l^\star = 4.50$m

$$\sigma_x^{\mathrm{core}} = (480 \pm 1)\mathrm{nm}$$

$$\sigma_y^{\mathrm{core}} = (6.20 \pm 0.01)\mathrm{nm}$$

Effect of half dipole line

- We have replaced the full dipole configuration by a half dipole configuration followng real 500GeV lattice.

Without SR	3.51	3.51'	4.50	4.50'
l^*	3.51	3.51'	4.50	4.50'
σ_x^*	479.5	479.5	488.3	488.3
σ_y^*	5.78	5.78	6.42	6.42
$\mathcal{L}_T$	2.25	2.23	2.45	2.45
$\mathcal{L}_{1\%}$	1.36	1.34	1.47	1.46

With SR	3.51	3.51'	4.50	4.50'
l^*	3.51	3.51'	4.50	4.50'
σ_x^*	480.2	480.6	488.5	488.5
σ_y^*	5.79	5.79	6.59	6.59
$\mathcal{L}_T$	2.25	2.22	2.46	2.47
$\mathcal{L}_{1\%}$	1.35	1.34	1.47	1.46

- Synchrotron radiation effects remain low.
- Increase dispersion at sextupole for better optimization?

Conclusions and Future prospects

- Synchrotron radiation has a very small effects even considering half length dipoles.

- Should we consider increase dipole strength for better nonlinear correction?

- Search for an optimum β^* including traveling focus.