

Status of Hollow Electron Lens Simulations with SixTrack

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Simulation setup with E-lens in SixTrack

- $1e4$ particles sampled as a halo from 4-6 normalized sigma of $2.5\mu\text{m}$, $dp/p=0$, starting in IP1
- Optics: HL-LHCv1.0 7TeV presqueeze $\beta^*=6\text{m}$, $Q'=3$, no octupoles, without errors
- $1e5$ turns ($1e6$ turns ~ 90 seconds still running on batch-system)

- HEL with DC current at -40m of IP4
(random mode was set up but not yet stud

outer radius $r_2=2.1\text{mm}$

inner radius $r_1=1.1\text{mm}\sim 4\text{sig}_{2.5\mu\text{m}}$

$r_2/r_1=1.88\text{mm}$

- applied kick-strengths

5A $\sim 3.71e-4$ mrad

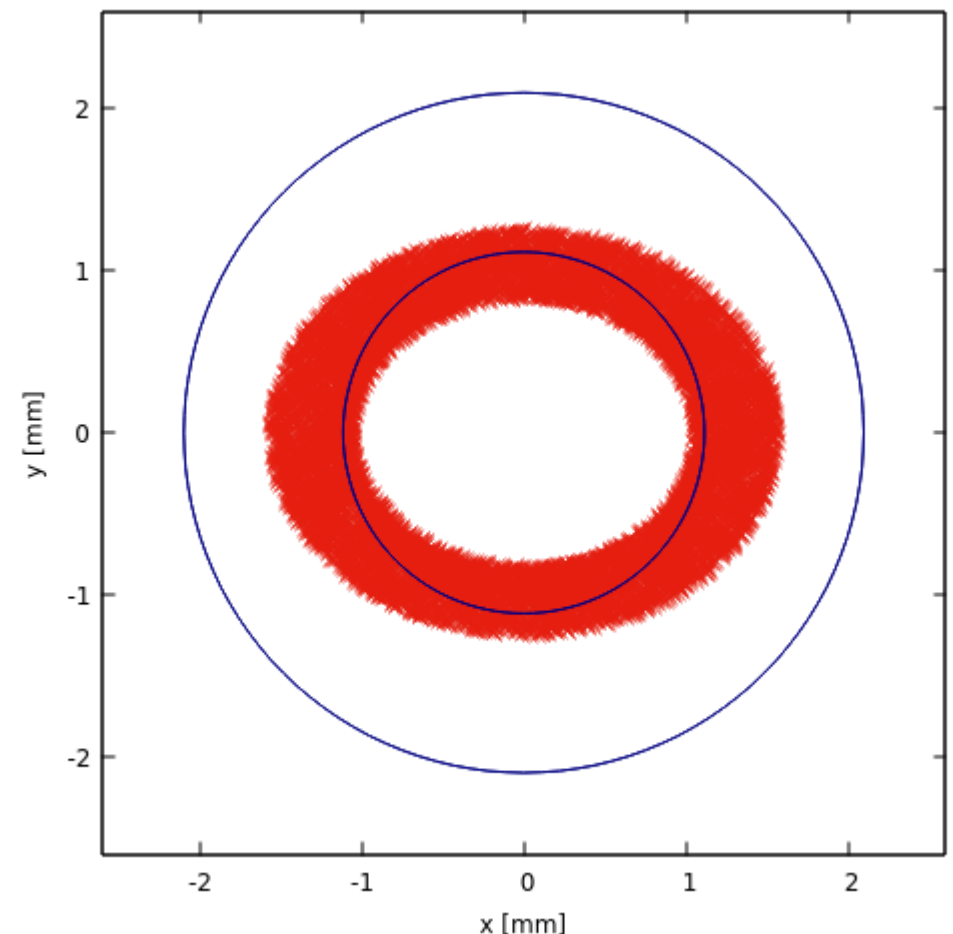
3.6A $\sim 2.67e-4$ mrad

1A $\sim 7.42e-5$ mrad

- TCP's in IP7 at $5.7\text{sig}_{3.5\mu\text{m}}$

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For all simulations no losses were
observed

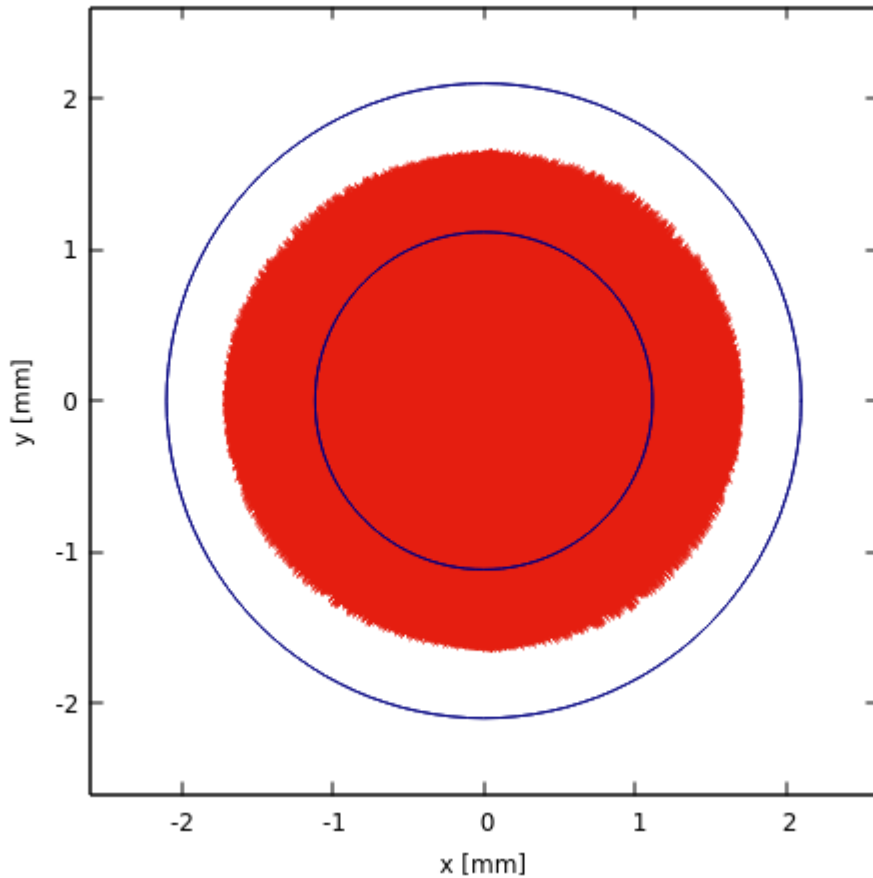


Distribution of 1st turn at HEL position

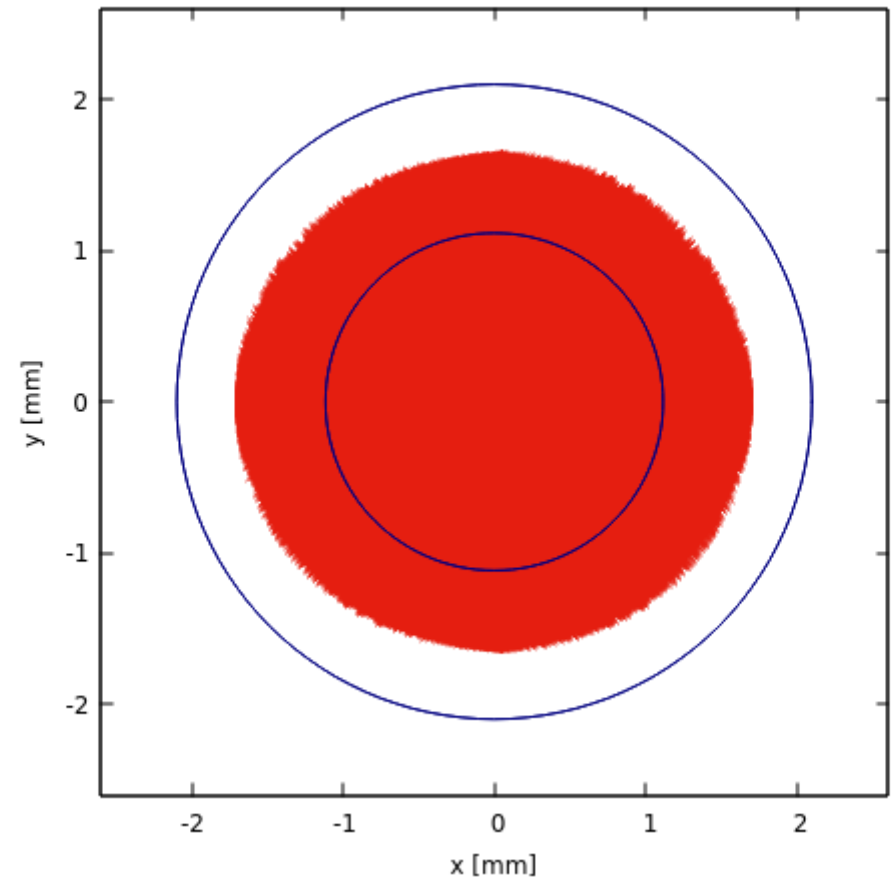
Covered space after $1e5$ turns at the position of the electron lens for currents of 0 and 5A.

It seems that no particles are driven to higher amplitudes

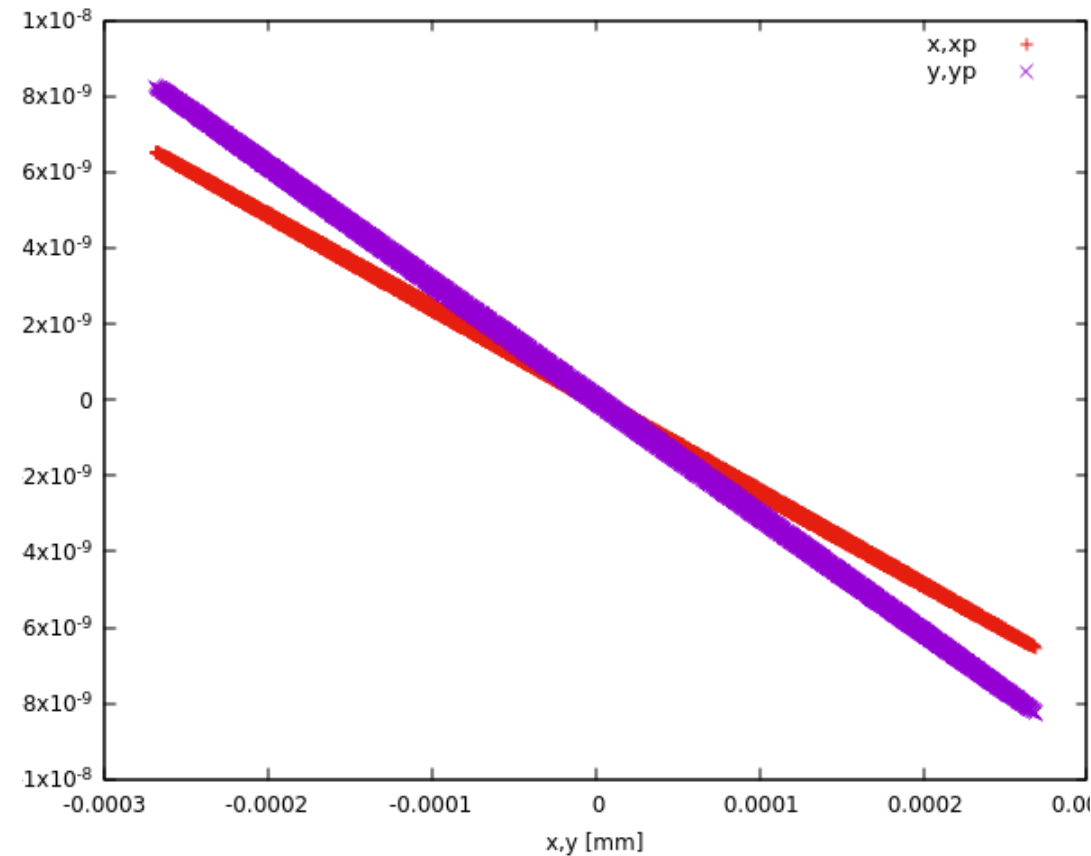
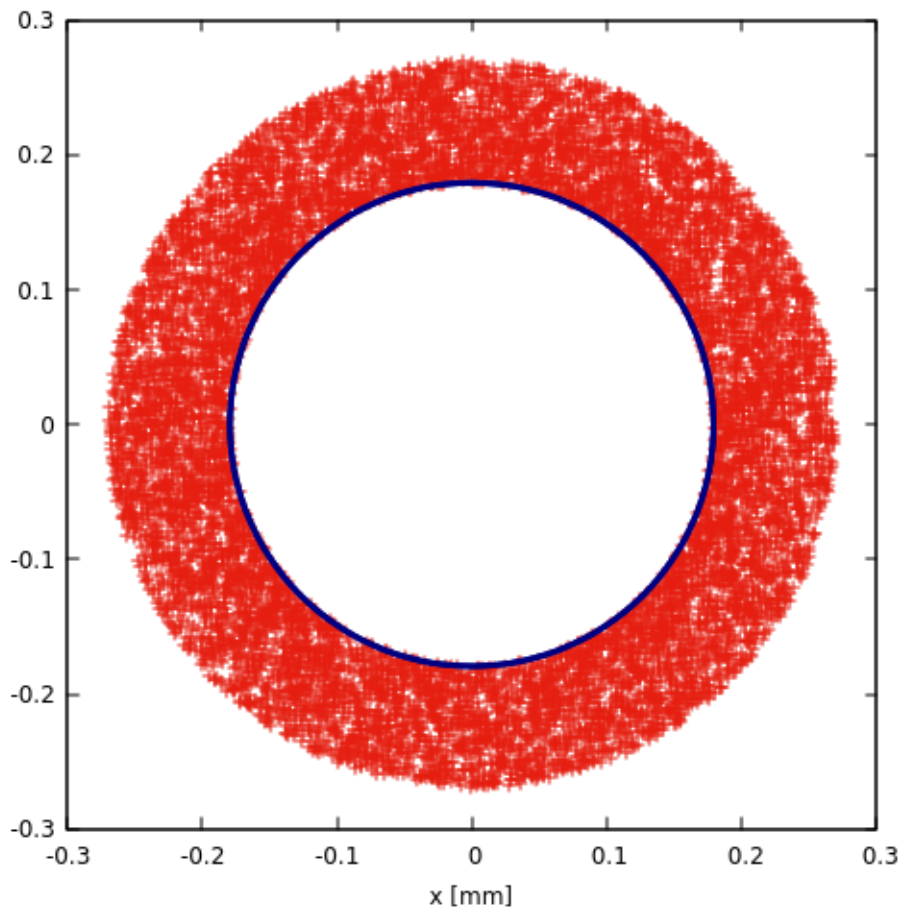
HEL dc 0A - distr at hel after $1e5$ turns



HEL dc 5A - distr at hel after $1e5$ turns



It might be related to not matched input distribution due to failure in transforming from normalized phase space to real phase space



Initial distribution in IP1