

Solenoid effects in CLIC

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Linear Collider Workshop

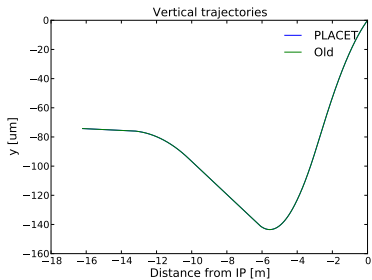
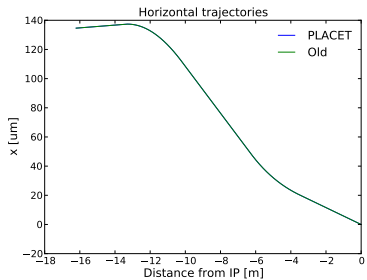
25. October, 2012

- Integration of code
- Trajectory comparison with old code
- Recent results
- Future planning

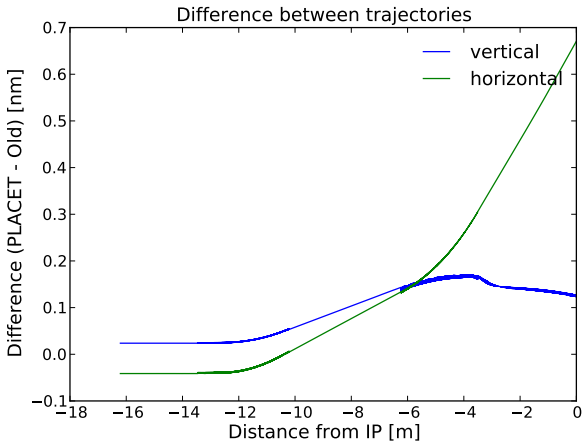
```
...  
TestIntRegion -beam beam1 -emitt_file emitt.dat  
              -angle 0.001 -step 0.005 -synrad 1  
              -filename ildantinobuck.txt
```

- Tracking method **TestIntRegion** now considered fully debugged.
- 4th order symplectic integrator.
- Example in svn, in folder examples/irtracking.
- Dipoles **not correctly treated** yet (challenging to define orbit).
- **Not available** in existing tracking methods, TestFreeCorrection, TestSimpleCorrection...

Trajectories...



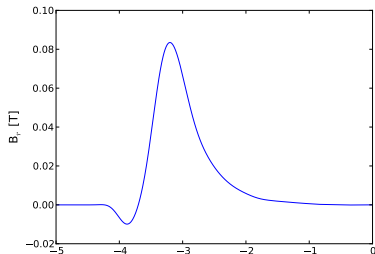
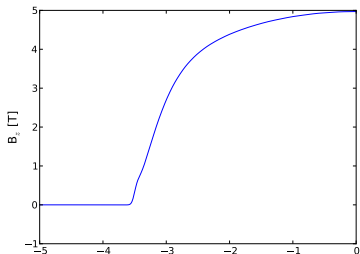
Trajectories...



Luminosity...

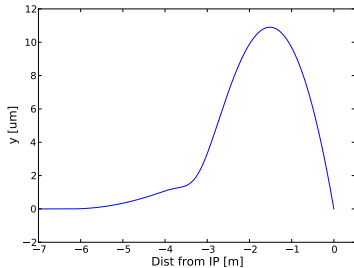
	Old	PLACET
L_{peak}	96.7 %	95.5 %
L_{tot}	95.7 %	95.3 %

- Numbers are averages from several GUINEA-PIG runs.
- Excellent agreement between the two codes.
- Used map “ildantinobuck”, an old ILD map without bucking coil.



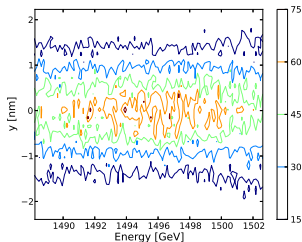
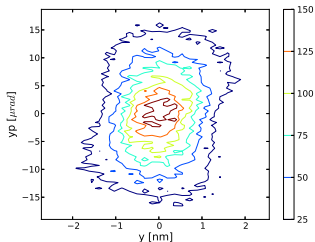
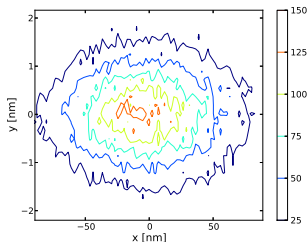
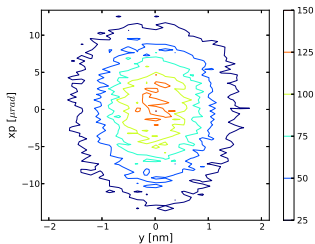
- Map from November 2011 (update underway)
- SiD with anti-solenoid.
- Main luminosity loss from combination of QD0-field and B_r .

Vertical Orbit

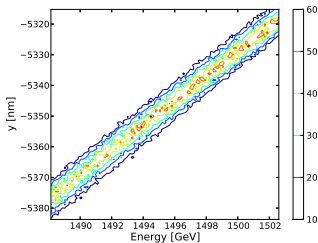
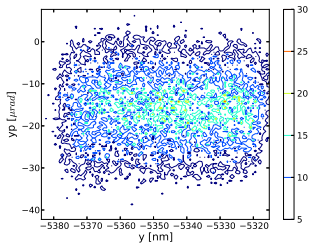
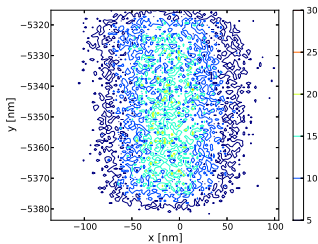
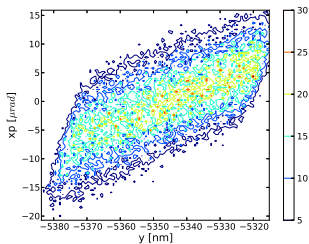


- About 11 μm
- Similar to previous results using old code

Distributions at IP - only synchrotron radiation



Distributions at IP - SR and Solenoid

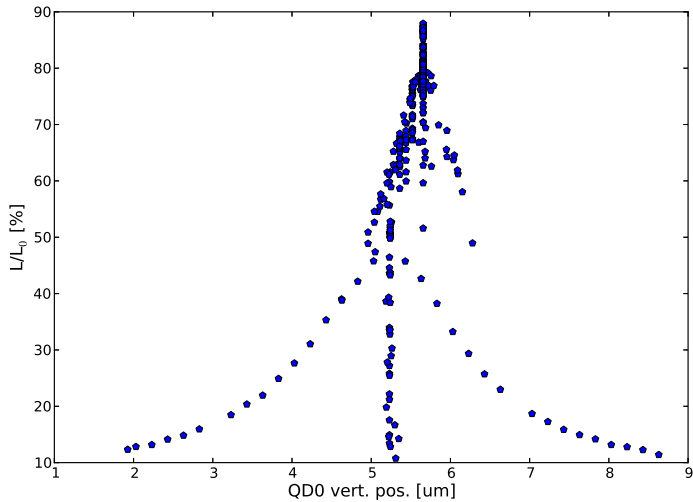


Luminosity

	w/o solenoid [$10^{34}/\text{cm}^2/\text{s}$]	w solenoid [% of ideal]
L_{peak}	1.91	96.5
L_{tot}	6.38	96.1

- Better than reported last year ($\sim 14\%$).
- We found after a lot of debugging that synchrotron radiation was counted twice ($+10\%$).

Tuning



- Code finally gives results in **excellent agreement** with previous external code.
- Theoretical luminosity loss due to solenoid with most recent SiD map \sim **4-5 %**.

- Tuning simulations. [started]
- Analyse new field maps. [underway]
- Misalignments of solenoid wrt beamline.