# Early Solenoid Tracking Results in PLACET

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# IR Tracking in PLACET

- Integration of code
- Examples of checks that have been made
- Recent results
- Future planning

# IR Tracking in PLACET

Earlier talks on the same topic:

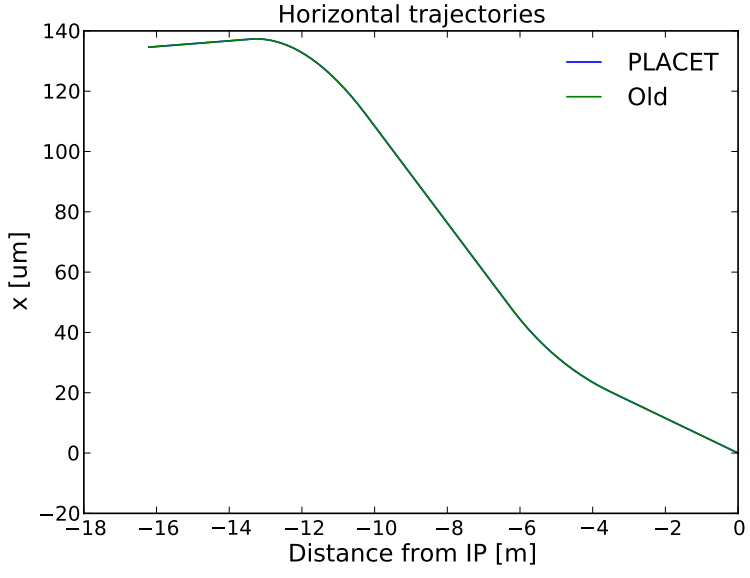
| | |
|---|---|
| April'12 | CLIC BDS Review |
| May'12 | CLIC Collaboration Working meeting |
| July'12 | MDI meeting |
| >2012 | Many presentations by Barbara |

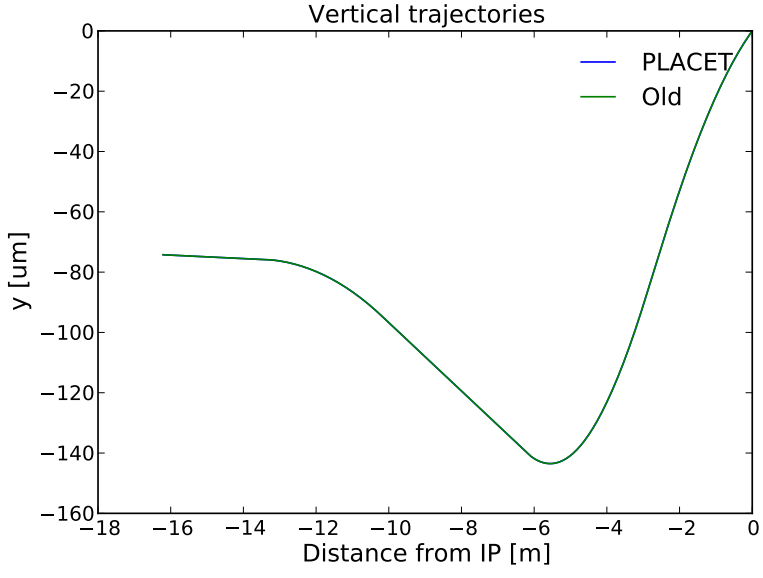
# IR Tracking in PLACET

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

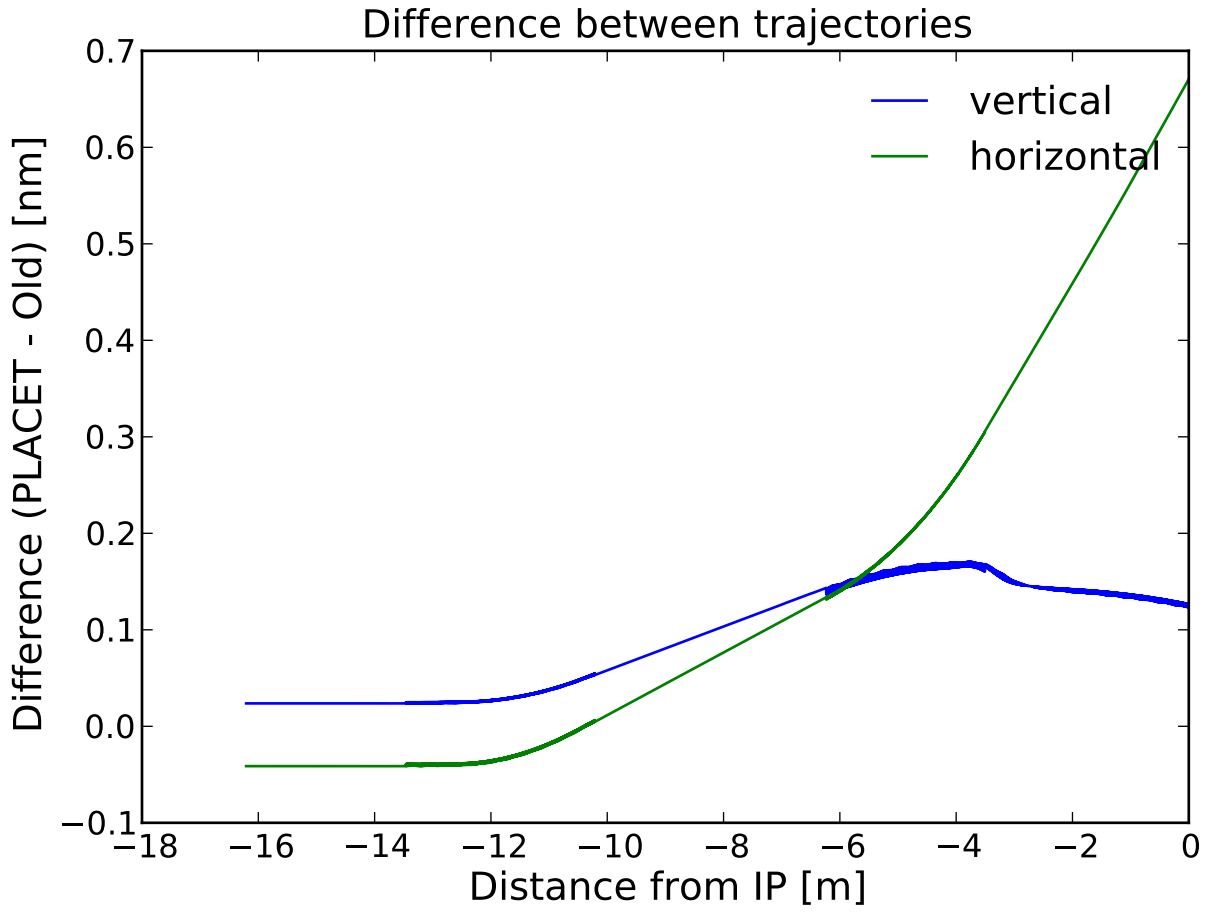
- Tracking method **TestIntRegion** now considered fully debugged.
- 4th order symplectic integrator, using field from magnets + solenoid.
- Example script in svn, in folder examples/irtracking.
- Dipoles not correctly treated yet (challenging to define orbit).
- Not available in existing tracking methods,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

# Trajectories...



# Trajectories...

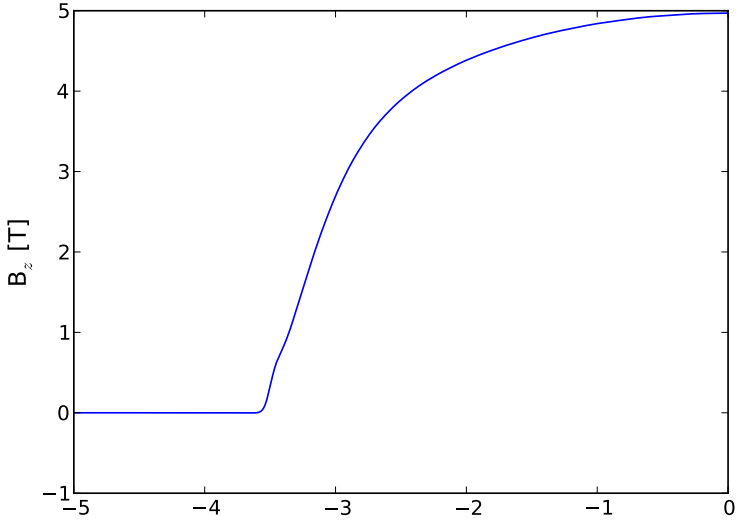


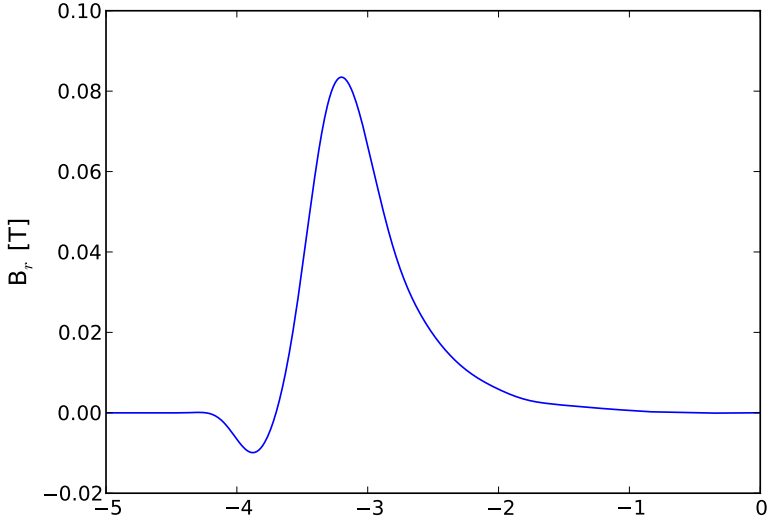
# Luminosity...

| | 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.

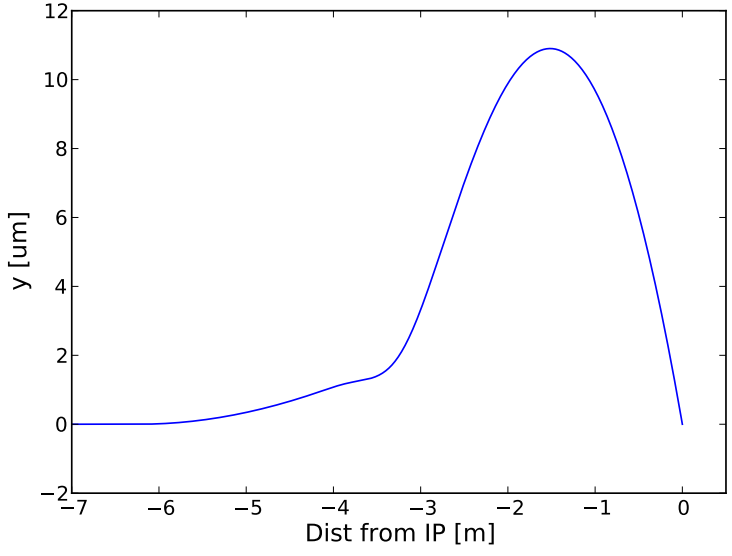
# Preliminary Results



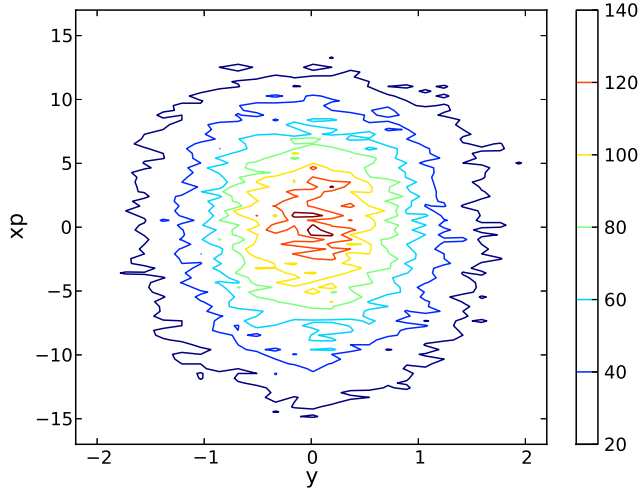

- Map from November 2011 (update underway)
- SiD with anti-solenoid.
- Main luminosity loss from combination of QD0-field and $B_r$.

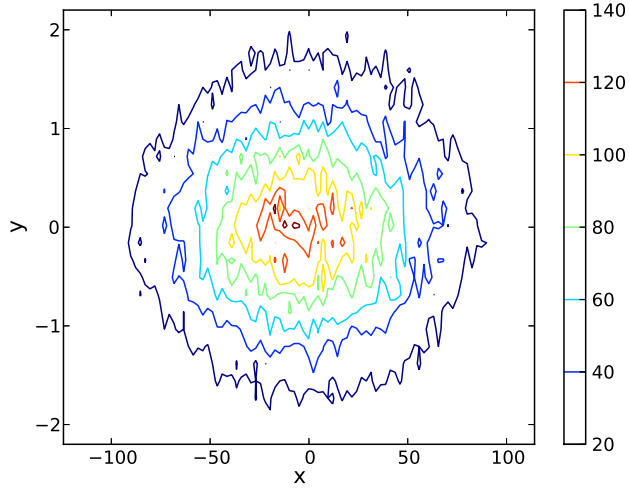
# Vertical Orbit

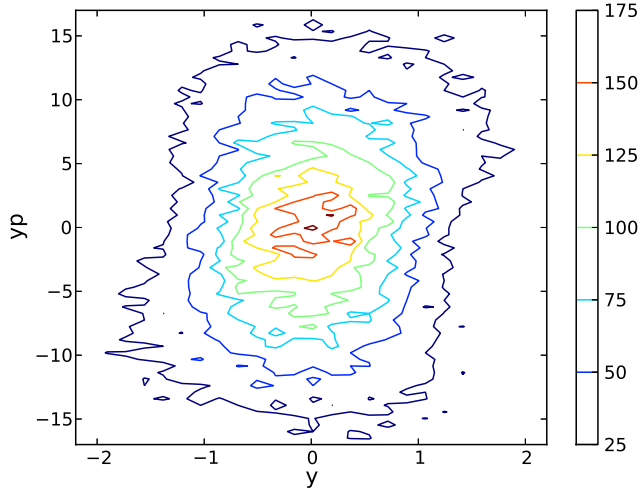


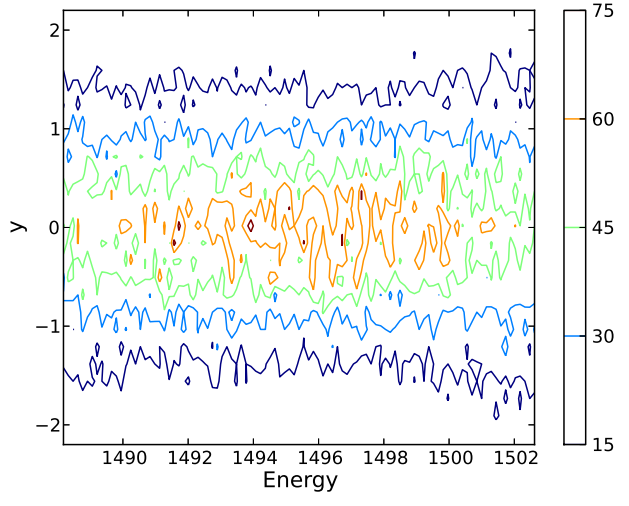

- About $11\ \mu\mathrm{m}$
- Similar to previous results by Barbara

# Distributions at IP - only ISR

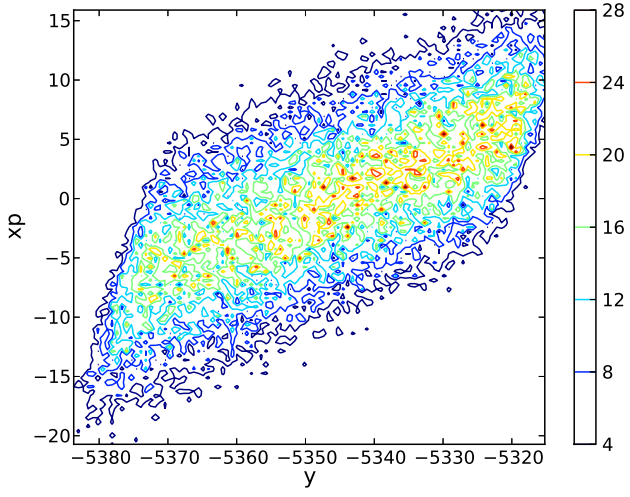


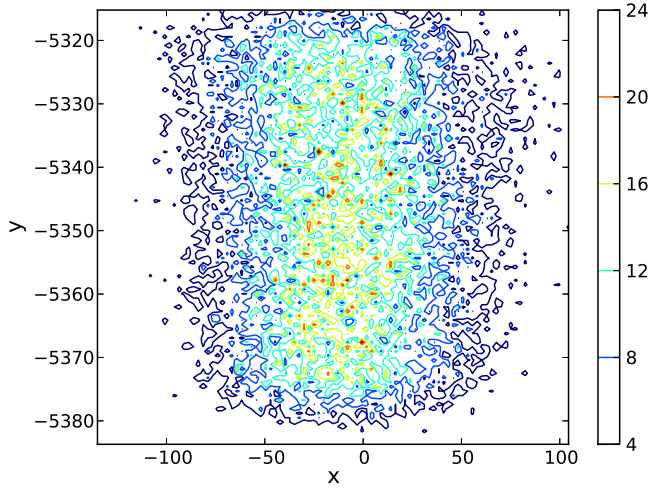



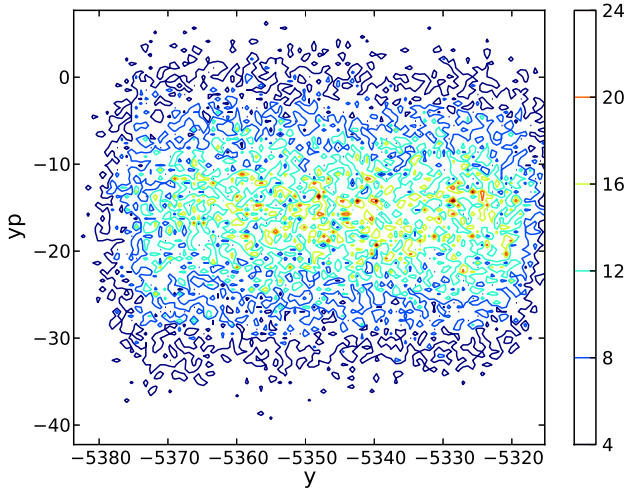



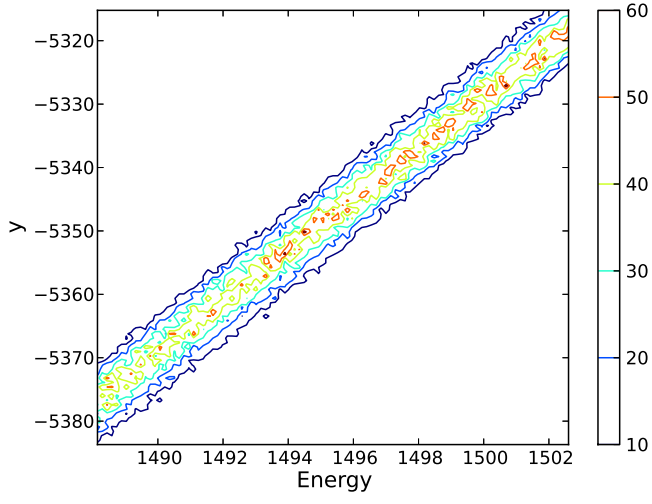



# Distributions at IP - ISR and Solenoid



# Luminosity

| | w/o solenoid $[10^{34}/\mathrm{cm}^2/\mathrm{s}]$ | w solenoid [% of ideal] |
|---|---|---|
| $L_{peak}$ | 1.59 | 96.5 |
| $L_{tot}$ | 5.32 | 96.1 |

- Better than reported last year (~14%).
- We found after a lot of debugging that ISR was counted twice (+10%).

# Summary

- Code gives results in excellent agreement with old code by Barbara.
- Theoretical luminosity loss due to solenoid with most recent SiD map $\sim$ 4-5 %.

# Next Steps

- Tuning simulations: Starting with sextupole knobs from Barbara&Eduardo. [started]
- New field maps. [underway]
- Misalignments of solenoid wrt beamline.
- Start implementation of step functions in PLACET.