

# Minimal tracking example: from MADX to luminosity

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This tutorial and the related PLACET files are located at:

```
/afs/cern.ch/eng/sl/lintrack/TEX/PLACET_Tutorials/  
MinimalBDStracking/
```

Hopefully we will put together a good collection of tutorials!

## Minimal tracking example: PLACET from MADX <sub>2</sub>

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The MADX (bds.madx) job for producing PLACET input:

```
...[MADX lattice definition]...
select, flag=twiss,column=name,keyword,s,l,angle,K1L,K2L,K3L,
tilt,E1, E2,type,k4l;
use, period=NOENTRBDS;
twiss,BETX=374.9998257,BETY=0.9999872268,file="nebds.twiss";
system, "madXoptics.tcl nebds.twiss nebds.placet";
system, "rm nebds.twiss";
stop;
```

The file nebds.placet is the PLACET input containing the lattice definition

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The lattice in PLACET format looks like this:

Girder

Quadrupole -synrad \$srad -1 2.5 -strength [expr 0.1\*\$e0]

Girder

Drift -1 1.25

Girder

Sbend -synrad \$srad -1 11.3 -angle 2.5e-05 -e0 \$e0

set e0 [expr \$e0-14.1e-6\*(...)/11.3\*\$e0\*\$e0\*\$e0\*\$e0]

Girder

Drift -1 2.25

Girder

Multipole -synrad \$srad -type 3 -1 1.2 -strength [expr -0.1\*\$e0]

The file trackbds.tcl contains the tracking initial conditions of and the commands to launch the tracking:

```
set e_initial 1496
set e0 $e_initial
set script_dir ~rtomas/w1/PLACET/CLIC_example
set synrad 1
source $script_dir/clic_basic_single.tcl
source nebds.placet
```

Energy is set, the location of PLACET scripts is given, radiation is set, lattice inputs are read.

The file trackbds.tcl contains the tracking initial conditions of and the commands to launch the tracking:

```
BeamlineSet -name test
array set match {
alpha_x 0.0
alpha_y 0.0
beta_x 374.9998257
beta_y 0.9999872268
}
set match(emitt_x) 6.8
set match(emitt_y) 0.1
```

The name of the beamline is given and some input parameters are defined.

The file trackbds.tcl contains the tracking initial conditions of and the commands to launch the tracking:

```
set n_slice 21
set n 7
set n_total 10000
source $script_dir/clic_beam.tcl
make_beam_many beam0 20 500
BeamRead -file particles.in -beam beam0
```

The beam slices and particles to be considered are defined. Particles are generated in particles.in.

The file trackbds.tcl contains the tracking initial conditions of and the commands to launch the tracking:

```
FirstOrder 1
```

```
TestNoCorrection -beam beam0 -emitt_file emitt.dat -survey Zero
```

```
source $script_dir/clic_guinea.tcl
```

```
set gp_param(n_x) 128
```

```
(...)
```

```
write_guinea_offset_angle 0.0 0.0
```

```
exec cp particles.out electron.ini
```

```
exec cp particles.out positron.ini
```

```
exec guinea default default default
```

```
exec grep lumi_ee= default > lumi
```

Finally the tracking is launched with TestNoCorrection and luminosity is computed by executing Guinea code.

11<sup>th</sup> October

Possible topics:

- Bunch compressor (AL)
- PLACET in Octave (AL)
- Tuning knobs/optimization (PE)
- Collimation studies (JR)
- Collimator wake fields (GR, AL)
- Dispersion free steering (DS)
- ... (your proposal)