OPAL V 1.0.0

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- OPAL is build from ground up as a parallel application
- OPAL runs on your laptop as well as on the largest HPC clusters
- OPAL uses the MAD language with extensions
- OPAL is full integrated in H5PartROOT post processing tool

The following OPAL flavours exist:

- OPAL-T
- OPAL-CYCL
- OPAL-MAP (not yet released in V1.0)

The manual is at: amas.web.psi.ch under Documentation

DC-Gun Example (for the full example see the user guide)

```
Option, PSDUMPFREQ=10;
....

SP1: Solenoid, L=1.20, ELEMEDGE=-0.5265, FMAPFN="1T1.T7",
          KS=0.00011;
SP2: Solenoid, L=1.20, ELEMEDGE=-0.3920, FMAPFN="1T2.T7",
          KS=0.00000;
SP3: Solenoid, L=1.20, ELEMEDGE=-0.2620, FMAPFN="1T2.T7",
          KS=0.00000;

gun: RFCavity, L=0.018, VOLT=-131/(1.052*2.658)*0.9616,
          FMAPFN="1T3.T7", ELEMEDGE=0.00,  ..... ;

l1:   Line = (gun,sp1,sp2,sp3);
```

DC-Gun Example (for the full example see the user guide)

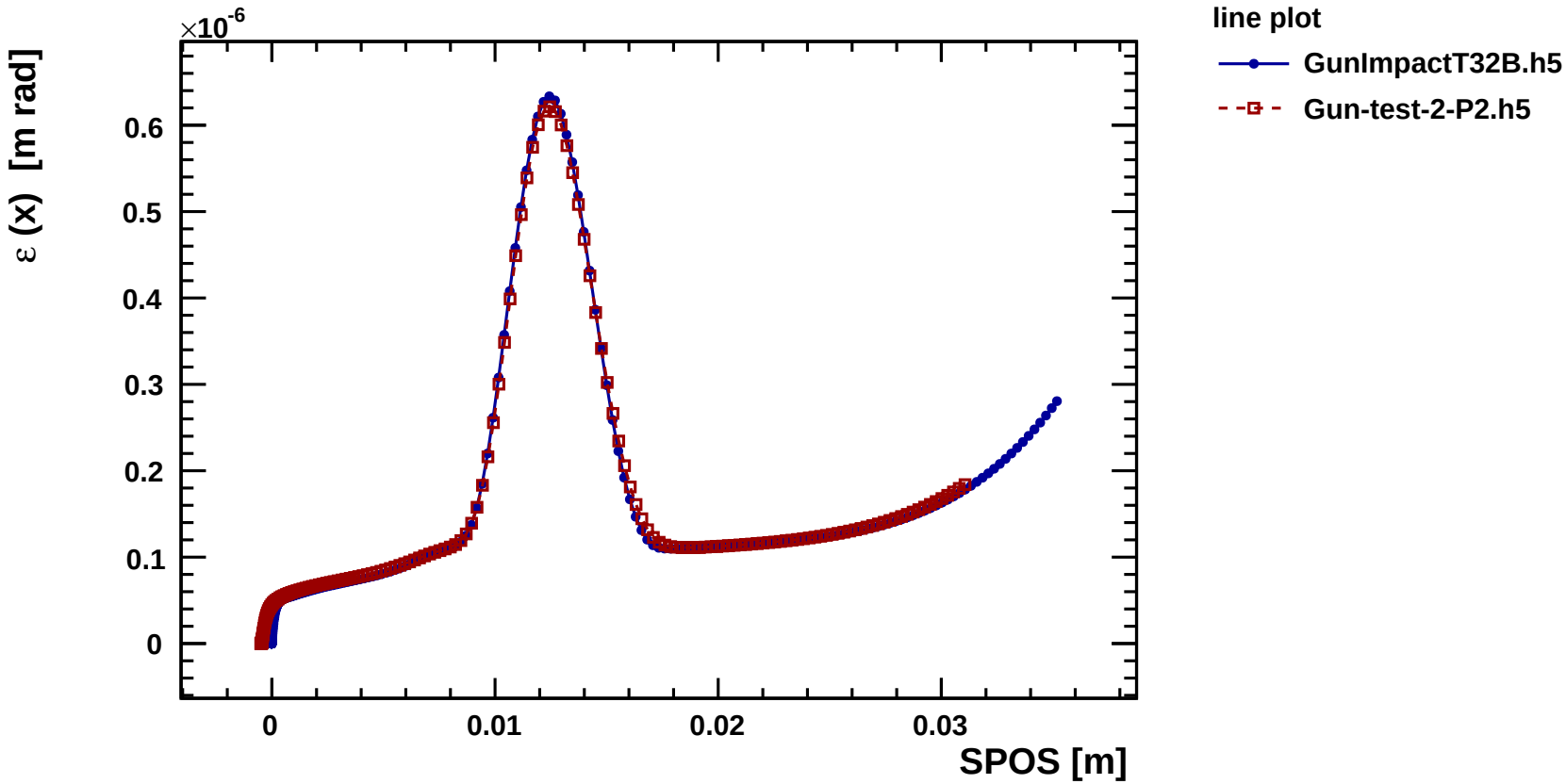
```
Dist1:DISTRIBUTION, DISTRIBUTION=gungauss,
sigmax=  0.00030, sigmapx=0.0, corrx=0.0,
sigmay=  0.00030, sigmapy=0.0, corry=0.0,
sigmat=  lz, sigmapt=1.0, corrt=0.0 , TEMISSION=39.0e-12,
NBIN=10, DEBIN=1;

Fs1:FIELDSOLVER, FSTYPE=FFT, MX=32, MY=32, MT=32, ... ;

beam1: BEAM, PARTICLE=ELECTRON, pc=P0, NPART=5e4,
             BCURRENT=rf*qb, BFREQ=rf, CHARGE=-1;

Select, Line=l1;
track,line=l1, beam=beam1, MAXSTEPS=2000, DT=1.0e-13;
 run, method = "PARALLEL-T", beam=beam1, fieldsolver=Fs1,
distribution=Dist1;
endtrack;
```

One example of an non trivial test-example is the PSI DC GUN. This example is part of the regression test suite running every night.



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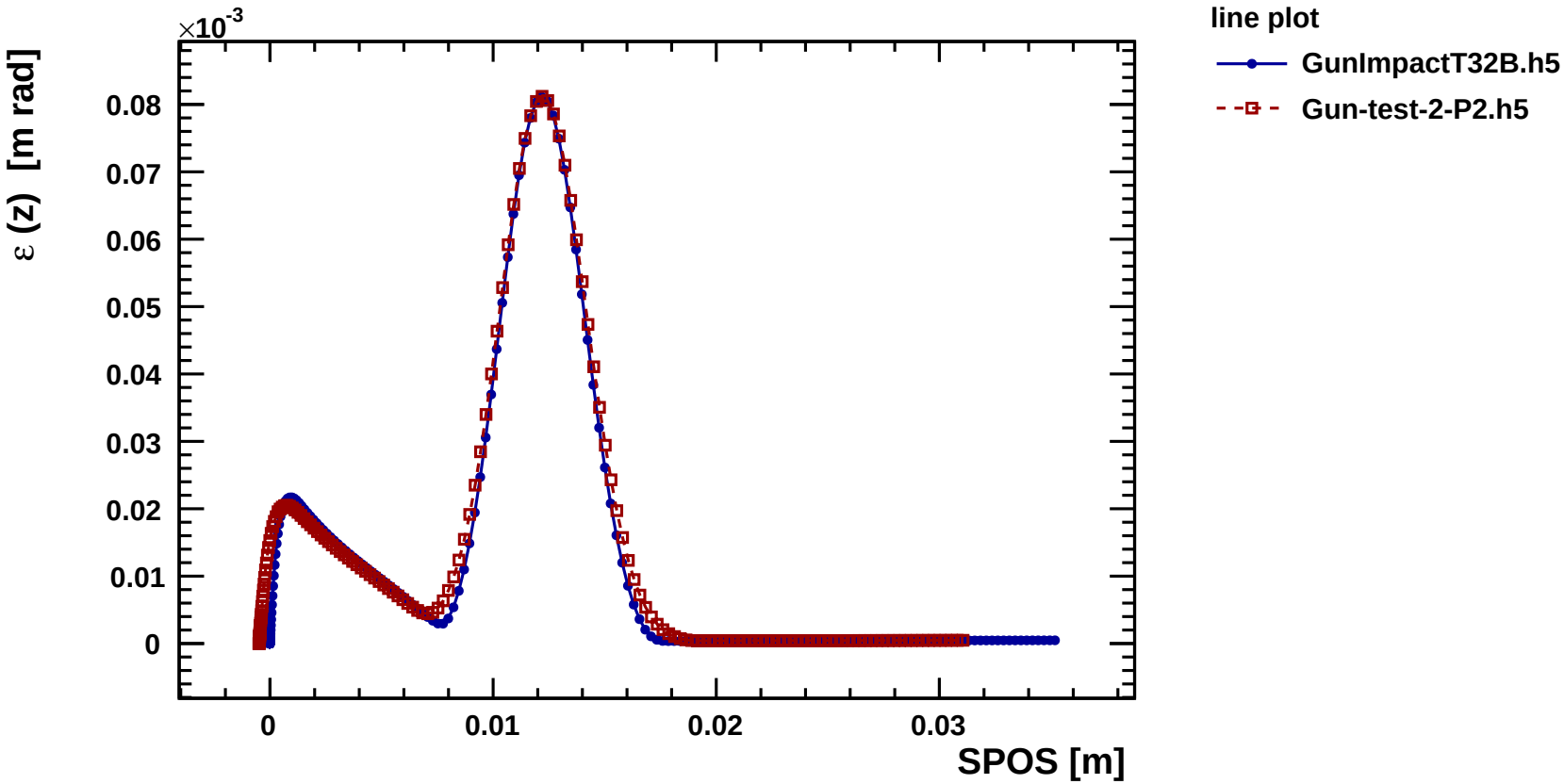
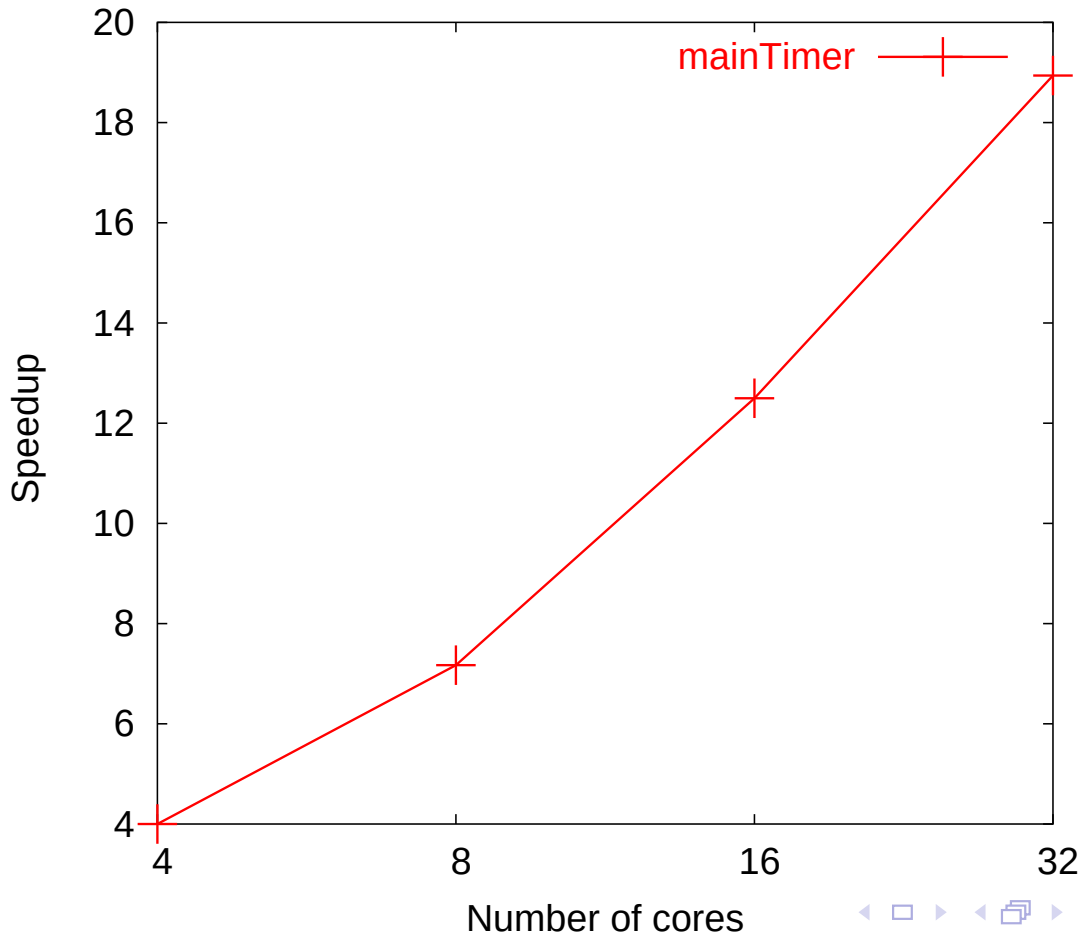


Parallel Speedup:



Name	implemented	tested
Algorithms		
ParallelTTracker	x	x
ParallelCyclotronTracker	x	x
FFT based space charge solver	x	x
integrated Greens function, FFT based space charge solver	x	x
Elements		
Cyclotron	x	x
RFCavity	x	x
Solenoid	x	x
Traveling Wave	x	x
RBend	x	(1.0.1)
Multipole	x	(1.0.1)

Name	Version (estimated)
Algorithms	
longitudinal and transverse wake fields	1.1
ML based space charge solver	1.1
1D csr wake fields	1.1
OPAL-T in BET mode	?
2D FETD self-consistent solver	1.2
3D FETD self-consistent solver	1.2
OPAL-MAP	1.2
Elements	
Collimator Screen	1.0.1(2)

OPAL-T can help us to quantitatively understand important quantities such as normalised and slice emittance in large an complicated machines. In such cases HPC helps us to increase the necessary statistics and precision in the 3D field calculations.

- OPAL-T is ready for OBLA phase 1 & 2
- OPAL-T is ready for 250 MeV injector up to BC1
- OPAL can be used on Merlin (module load opal) and Horizon
- Check out the manual at: **amas.web.psi.ch** under Documentation