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Langevin Meeting

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Problem: Upwards Trend of the Emittance

- Potential Causes
  - Timestepping might not be conserving (tested with synchronous Leapfrog scheme / Velocity Verlet) ☑
  - Check that $\gamma = 1$ ☑
  - Macro-particle number is the same as simulated particles ☑
  - Check Correlation Matrix with analytical values of Normally Distributed particles in the sphere ☐
- Furthermore
  - Merge the two dumping functions into `129-langevin-collision_refactored` ☑
  - Start optimizing memory consumption ☐

Separate Gradient Computation

```
// In ChargedParticles.cpp:
// sp.add("output_type",Solver_t::GRAD) -> sp.add("output_type",Solver_t::SOL)
P->scatterCIC(NP, 0, hr);
P->solver_mp->solve();
P->E_m = - grad(P->rho_m);
P->gatherCIC();
```

P3M Timestepping (Synchronous Leapfrog)

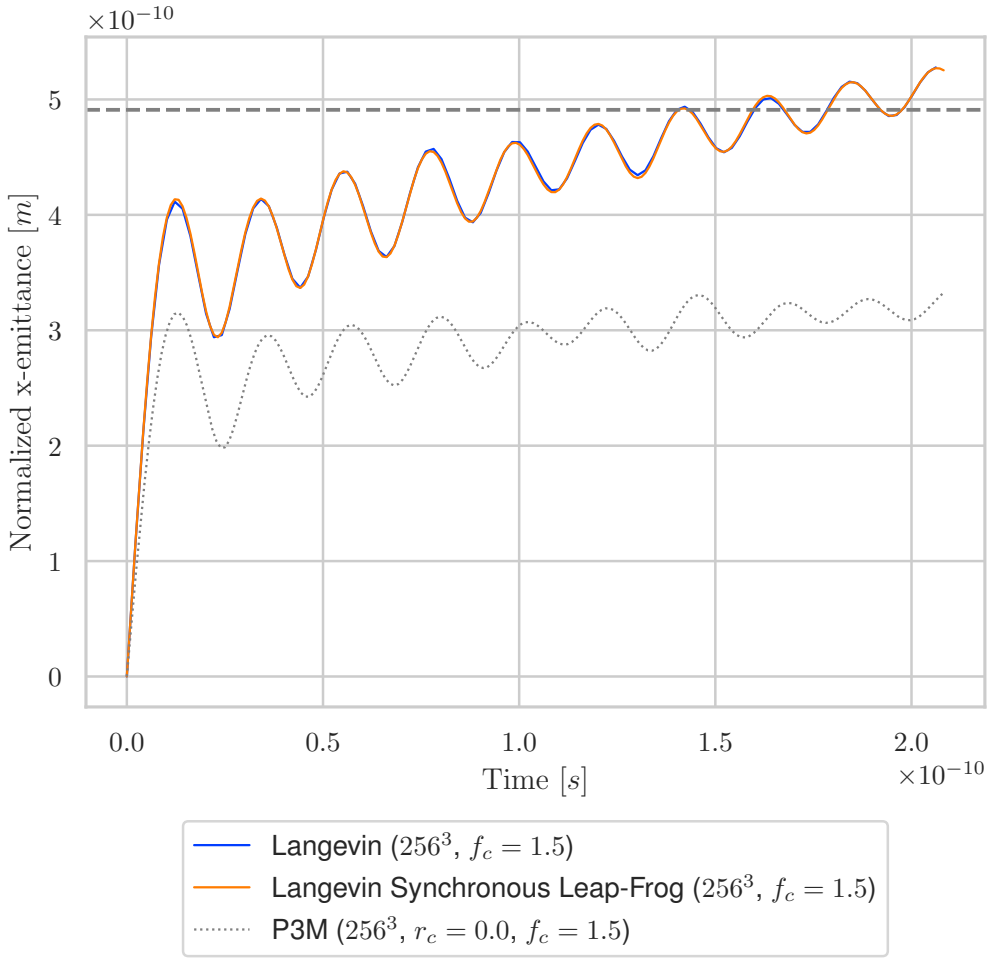

Figure 1: Synchronous Leapfrog.

Gamma Factor

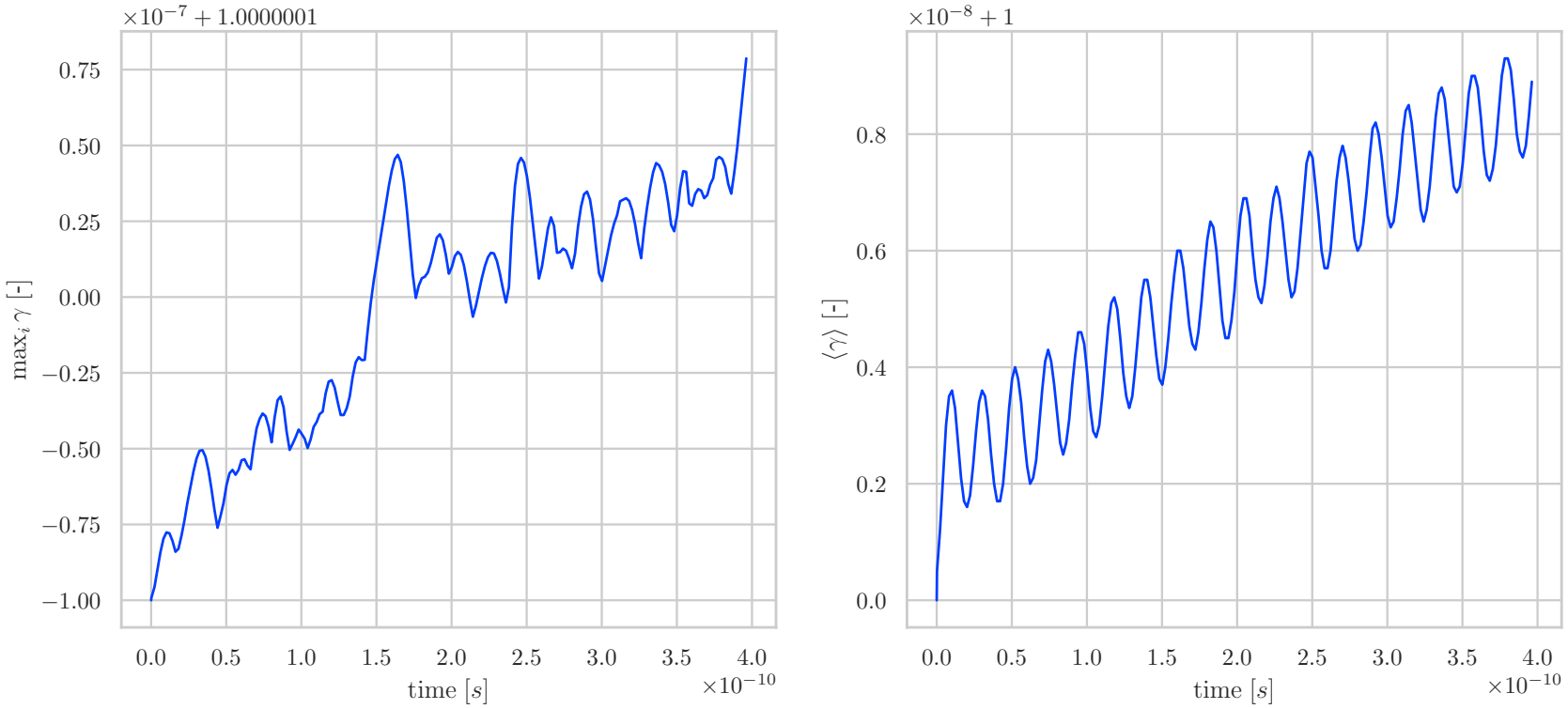

Figure 2: Gamma Factor Check. It is equal to 1 as expected.

Increased Focusing

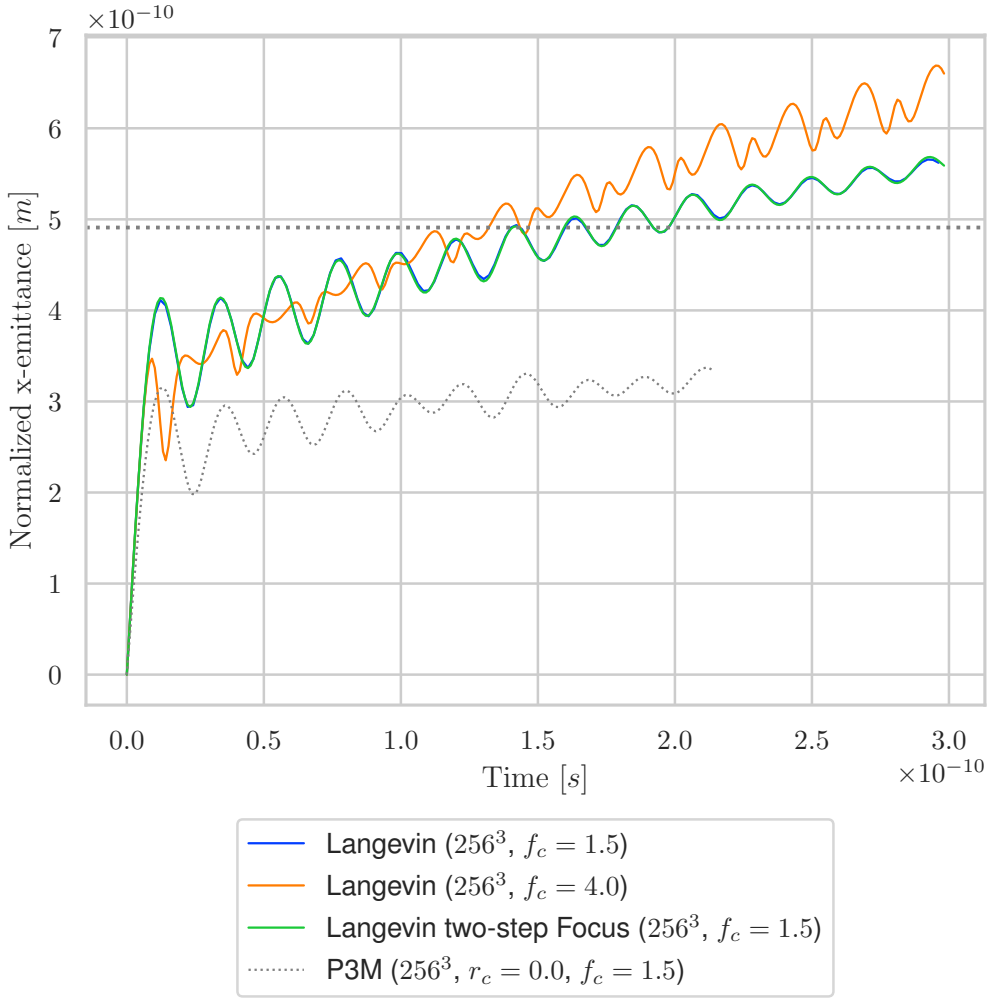

Figure 3: Increased Focusing Strength causes expected periodic behaviour to break down.