

Implementation of a structure preserving particle code based on the AMReX library

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In [1] a structure preserving geometric particle-in-cell framework for the discretization of the Vlasov-Maxwell equations was introduced. In this talk, we will present the implementation of this method based on the AMReX library. AMReX [2] [3] is an adaptive mesh refinement software framework, implemented in C++, containing data structures and functionalities necessary to implement parallel algorithms based on grids and particles. The library offers parallel loops, in which the domain and the particles are split over multiple processes, and takes care of the necessary communication. We will present the AMReX library, focusing on its data structures and parallelisation functionalities. Furthermore we will talk about how its components can be leveraged to build a particle-in-cell code and present our new library.

References

- [1] Kraus, M., Kormann, K., Morrison, P. J., Sonnendrcker, E., *GEMPIC: Geometric electromagnetic particle-in-cell methods*. Journal of Plasma Physics, 83(4) 2017.
- [2] AMReX Code: <https://github.com/AMReX-Codes/amrex.git>.
- [3] AMReX Documentation: <https://amrex-codes.github.io/amrex/docs.html>.