AMReX

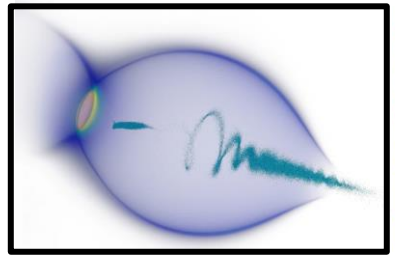
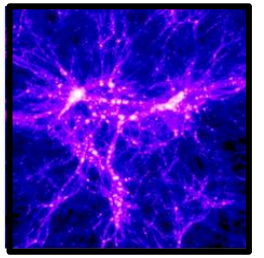
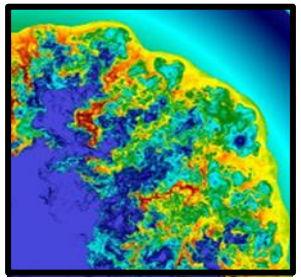
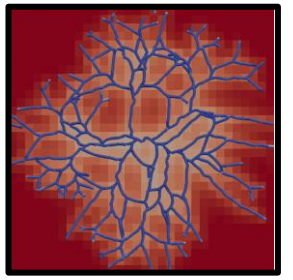
BERKELEY LAB

Block-structured adaptive mesh refinement framework. Scalable support for hierarchical mesh and particle data, with embedded boundaries.

- **Capabilities**
  - Support for PDEs on a hierarchical adaptive mesh with particles and embedded boundary representations of complex geometry
  - Support for multiple modes of time integration
  - Support for explicit and implicit single-level and multilevel mesh operations, multilevel synchronization, particle, particle-mesh and particle-particle operations
  - Hierarchical parallelism –
    - hybrid MPI + OpenMP with logical tiling on multicore architectures
    - hybrid MPI + GPU support for hybrid CPU/GPU systems (NVIDIA CUDA, AMD HIP, Intel SYCL)
  - Native multilevel geometric multigrid solvers for cell-centered and nodal data
  - Highly efficient parallel I/O for checkpoint/restart and for visualization – native format supported by Visit, Paraview, yt
- **Open source software**
  - Used for diverse apps, including accelerator modeling, astrophysics, combustion, cosmology, multiphase flow, phase field modeling, atmospheric modeling and more
  - Source code and development hosted on github with rigorous testing framework
  - Extensive documentation, examples and tutorials

xSDK E4S

Examples of AMReX applications

FASTMATH ECP

https://www.github.com/AMReX-Codes/amrex