

Adaptive Mesh Refinement

Adaptive mesh refinement (AMR) is like a computational microscope; it allows scientists to “zoom in” on particular regions of space that are more interesting than others. Cosmologists might want to zoom in on detailed cosmic filaments; astrophysicists might focus on regions of nucleosynthesis; and combustion scientists may examine where the burning occurs.

Adaptive mesh refinement for exascale (AMReX) supports the development of block-structured AMR algorithms for solving systems of partial differential equations on exascale architectures and provides the basis for the temporal and spatial discretization strategy for a large number of applications relevant to DOE. AMR reduces the computational cost and memory footprint compared to a uniform mesh while preserving the local descriptions of different physical processes in complex multiphysics algorithms.

Principal Investigator: John Bell, Lawrence Berkeley National Laboratory

**Collaborators: Lawrence Berkeley National Laboratory
Argonne National Laboratory, National Renewable Energy Laboratory**