Dyablo : a new hardware-agnostic AMR code for Exascale

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Dyablo is a new Computational Fluid Dynamics (CFD) code using Adaptive Mesh Refinement (AMR) for Exascale supercomputers. In an effort to modernize the software stack for AMR astrophysical simulations, Dyablo is written in C++ and uses an MPI + Kokkos approach to parallelism. Kokkos is a performance portability library that enables writing a unique code to run on current CPUs, GPUs and other Exascale hardware architectures. Dyablo is also designed around the concept of "separation of concerns": implementation and optimization concerns are separated from physical and applied mathematics considerations to allow physicists to write physics kernels and computer scientists to optimize the performance with minimal interference. AMR is used in a wide variety of applications at various scales, from cosmology to solar simulation, and Dyablo will soon enable these applications to run on Exascale supercomputers.