Scaling a high energy laser application (VBL) using MPI and RAJA

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New high resolution simulation results

Two 150 micron phase defects (lower left), cause ripples to appear after 10 meters in the fluence of the beam (right). This effect is not seen until the much higher resolution simulations available using the upgraded code.

Example RAJA Policies

Single Core Policy

OpenMP RAJA::UsePolicy<RAJA::seq_exec, RAJA::seq_exec, RAJA::simd_exec >>;

CUDA

RAJA::UsePolicy<RAJA::cuda_block_s_exec, RAJA::cuda_threadblock_s_exec <16>, RAJA::cuda_threadblock_s_exec <64 >>;

OpenMP & CUDA performance

We converted our ‘mini-app’ from an MPI-only application to a hybrid application using the RAJA portability framework which provides a common interface to heterogeneous compute resources. With a minimal code footprint, we are able to use RAJA to express traversals over the spatio-temporal grid.

References


[2] National Ignition Facility • Lawrence Livermore National Laboratory • Operated by the U.S. Department of Energy

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