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Comparison of VPIC Performance on Several Modern Architectures

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Abstract

VPIC[1] is being ported and optimized on several modern architectures. These include KNL processors available on Trinity, Cori and Stampede2, Skylake processors available on Mare Nostrum and Stampede2, IBM Power 9 processors and Volta GPUs available on Summit and Sierra and ARM ThunderX2 processors, soon to be available on Astra at Sandia. VPIC is in production on several of these systems. These architectures vary in many ways including available memory bandwidth, vector length, threads per core, clock frequency and overall node architecture. This work is focused on single node performance. Current efforts to optimize single node performance are exploring changes to data layout of key data structures and performance profiling with a variety of performance analysis tools. Results will be presented which compare the performance of VPIC on these different architectures.

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[1]K. J. Bowers, B. J. Albright, L. Yin, B. Bergen, and T. J. T. Kwan, Phys. Plasmas 15, 055703 (2008)