Development of an Implicit, Charge and Energy Conserving 2D Electromagnetic PIC Code on Advanced Architectures JOSHUA PAYNE, Los Alamos National Laboratory, WILLIAM TAITANO, University of New Mexico, DANA KNOLL, Los Alamos National Laboratory, CHRIS LIEBS, University of Colorado Boulder, KARTHIK MURTHY, Rice University, NICOLAS FELTMAN, Carnegie Mellon University, YIJIE WANG, University of South Florida, COLLEEN MCCARTHY, North Carolina State University, EMANUEL CIEREN, Los Alamos National Laboratory — In order to solve problems such as the ion coalescence and slow MHD shocks fully kinetically we developed a fully implicit 2D energy and charge conserving electromagnetic PIC code, PlasmaApp2D. PlasmaApp2D differs from previous implicit PIC implementations in that it will utilize advanced architectures such as GPUs and shared memory CPU systems, with problems too large to fit into cache. PlasmaApp2D will be a hybrid CPU-GPU code developed primarily to run on the DARWIN cluster at LANL utilizing four 12-core AMD Opteron CPUs and two NVIDIA Tesla GPUs per node. MPI will be used for cross-node communication, OpenMP will be used for on-node parallelism, and CUDA will be used for the GPUs. Development progress and initial results will be presented.

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