

Abstract Submitted
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An Unstructured Mesh Based Infrastructure for Exascale PIC Simulations¹ CHONGLIN ZHANG, GOPAKUMAR PERUMPILLY, GERRETT DIAMOND, CAMERON SMITH, ONKAR SAHNI, AGNIESZKA TRUSZKOWSKA, MARK SHEPHARD, Rensselaer Polytechnic Institute — Particle-in-cell (PIC) methods are effective for modeling fusion plasmas. In a number of important cases the simulation domain is complex and the fields have large spatial variations. In such cases it is desirable to take advantage of unstructured mesh technologies. This poster will overview PUMIpic, a distributed unstructured mesh infrastructure for PIC calculations and indicate the status of its use in two fusion plasma modeling applications. A key feature of PUMIpic is using a partitioned mesh as the core data structure with particles accessed via the mesh. Both the mesh and associated particle data structures, and the mesh/particle interaction operations are designed for effective execution on accelerator based exascale computers. PUMIpic is being used in the development of versions of two fusion plasma physics PIC codes; XCG for edge plasma simulations and GTR wall impurity transport simulations.

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Mark Shephard
Rensselaer Polytechnic Institute

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