

Abstract Submitted
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MPI parallelization of full PIC simulation code with Adaptive Mesh Refinement TATSUKI MATSUI, Kobe University, JST/CREST, MASANORI NUNAMI, National Institute for Fusion Science, HIDEYUKI USUI, TOSEO MORITAKA, Kobe University, JST/CREST TEAM — A new parallelization technique developed for PIC method with adaptive mesh refinement (AMR) is introduced. In AMR technique, the complicated cell arrangements are organized and managed as interconnected pointers with multiple resolution levels, forming a fully threaded tree structure as a whole. In order to retain this tree structure distributed over multiple processes, remote memory access, an extended feature of MPI2 standards, is employed. Another important feature of the present simulation technique is the domain decomposition according to the modified Morton ordering. This algorithm can group up the equal number of particle calculation loops, which allows for the better load balance. Using this advanced simulation code, preliminary results for basic physical problems are exhibited for the validity check, together with the benchmarks to test the performance and the scalability.

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