# Parallel Finite Volume Code for Plasma with Unstructured Adaptive Mesh Refinement

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**Keywords**: *Ionization waves, Finite Volume method, Unstructured mesh, Mesh refinement, MUMPS, METIS, Parallel algorithms.*

The present paper describes a parallel unstructured-mesh Plasma simulation code based on Finite Volume method (FVM). The code dynamically refines and coarses mesh for accurate resolution of the different features regarding the electron density. Our purpose is to examine the performance of a new Parallel Adaptive Mesh Refinement (PAMR) procedure introduced on the ADAPT platform, which resolves of a relatively complicated system coupling the flow partial differential equations to the Poisson's equation. The implementation deals with the MUltifrontal Massively Parallel sparse direct Solver (MUMPS) and mesh partitioning methods using METIS to improve the performance of the framework. The standard MPI is used to establish communication between processors. Performance analysis of the PAMR procedure shows the efficiency and the potential of the method for the propagation equations of ionization waves.

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