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**Parallel, Implicit, Finite Element Solver** WESTON LOWRIE, URI SHUMLAK, ERIC MEIER, GEORGE MARKLIN, University of Washington, PLASMA SCIENCE AND INNOVATION CENTER (PSI CENTER) COLLABORATION — A parallel, implicit, finite element solver is described for solutions to the ideal MHD equations and the Pseudo-1D Euler equations. The solver uses the conservative flux source form of the equations. This helps simplify the discretization of the finite element method by keeping the specification of the physics separate. An implicit time advance is used to allow sufficiently large time steps. The Portable Extensible Toolkit for Scientific Computation (PETSc) is implemented for parallel matrix solvers and parallel data structures. Results for several test cases are described as well as accuracy of the method.

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