Abstract Submitted
for the DPP05 Meeting of
The American Physical Society

A Finite Volume Approach to the Fully Compressible MHD Simulation of High β Tokamak Plasmas YASUHIRO KAGEI, Naka Fusion Research Establishment, JAERI, YASUAKI KISHIMOTO[1], Graduate School of Energy Science, Kyoto University, TAKAHIRO MIYOSHI, Graduate School of Science, Hiroshima University — A numerical approach based on the finite volume-spectral method is developed for the nonlinear and compressible magnetohydrodynamics(MHD) simulation of high β tokamak plasmas. The finite volume method has an advantage over the conventional finite difference method for that it is available for both structured and adaptive unstructured grid schemes. Furthermore, being based on the conservative form, it naturally satisfies the divergence free condition of magnetic field. In this work, first simulation results of the linear and nonlinear evolution of resisitive MHD instabilities using the quadrilateral structured mesh code are shown. Nonlinear behavior of a high β tokamak plasma with q<1 which is linearly unstable to both internal kink mode (n=1) and high n (n>$\sim$10) ballooning modes is investigated, and then finite beta effect on internal kink mode is discussed.

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Date submitted: 24 Jul 2005 Electronic form version 1.4