Sorting Category: 5.6.2 (Theoretical)

Application of a Constrained, Free Boundary Equilibrium FEM Code on the DIII-D Tokamak and Other Toroidal Configurations[1] J.A. LEUER, A.W. HYATT, M.J. SCHAFFER, M.L. WALKER, General Atomics, S.B. MAHAR, MIT — Finite element method (FEM) tools, which are readily available for the solution of partial differential equations, are developed for computation of free boundary, axisymmetric equilibria in the DIII-D tokamak and other toroidal devices. The FEM technique is coupled with optimization tools to allow offline computation of equilibria and plasma shapes subject to operational constraints such as power supply limitations and shaping coil circuits. In addition, the technique is used to explore more exotic machines and equilibria such as those produced in compact tori (CT) including field reversed configurations (FRC), doublet shapes, profiles with current holes, and highly elongated equilibria.

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Special instructions: Poster 28, Stability

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