

Abstract Submitted
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Plasma Response to External Magnetic Perturbations¹ M.S. CHU, L.L. LAO, M.J. SCHAFFER, T.E. EVANS, General Atomics, Y.Q. LIU, Culham, M.J. LANCTOT, H. REIMERDES, Columbia University — Plasma response to an external perturbation is formulated as minimization of the total free energy of the plasma and the external coils [1]. For tokamaks, this minimization is achieved by directly solving the resultant Euler equations using the MARS-F code [2] without resorting to the virtual casing principle. Neglecting the plasma response resulted in the vacuum response previously computed by the Surfmn code [3]. The vacuum response can be computed independently by using an analytic method. Results from MARS-F and Surfmn are found to give excellent agreement with that obtained by the analytic method. For ideal plasma, the total perturbation field in the plasma results from the plasma response in addition to that of the vacuum field. Depending on the coil arrangement, plasma response could be dominated by the resonant or non-resonant components.

[1] M.S. Chu, et al., Nucl. Fusion **43** (2003) 441.

[2] Y.Q. Liu, et al., Phys. Plasmas **7** (2000) 3681.

[3] M.J. Schaffer, et al., Nucl. Fusion **48** (2008) 024004.

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