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3D Equilibrium Reconstruction of DIII-D Discharges using V3FIT[1] A.C. SONTAG, J.H. HARRIS, M.W. SHAFER, E.A. UNTERBERG, Oak Ridge National Laboratory, J.D. HANSON, Auburn U., L.L. LAO, General Atomics — Non-axisymmetric perturbations to tokamak magnetic fields have become increasingly important for tokamak operation to modify pedestal profiles. Such modifications have led to ELM mitigation, triggering and full stabilization. These perturbations affect transport and stability at the plasma edge, but the physics mechanisms responsible for these changes are not fully understood. An open question is the degree of penetration of the applied fields, and whether these perturbations result in ideal distortions of the magnetic flux surfaces, create magnetic islands, or stochasticize the edge region. The V3FIT code is being used to reconstruct 3D equilibria for DIII-D discharges with the assumption of nested flux surfaces. The present work is a study of the ability of the V3FIT code to reliably reconstruct the plasma equilibrium state for a variety of discharge types with particular focus on the edge pedestal region. A diagnostic set consisting of magnetic diagnostics, ion and electron temperature and density profile and soft x-ray diagnostics is used for the reconstructions. The ability of these diagnostics to reconstruct equilibria that agree with observed toroidal asymmetries is assessed and the relative effectiveness of each diagnostic is determined.

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