

Abstract Submitted  
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**Equilibrium Reconstruction in LTX- $\beta$  using Response Functions<sup>1</sup>**

LEONID ZAKHAROV, LiWFusion, PAUL E. HUGHES, DENNIS B. BOYLE, Princeton University, PPPL, CHRIS HANSEN, University of Washington — The equilibrium reconstruction technique targets reconstruction of plasma profiles using external measurements of magnetic field around the plasma as well as internal measurements inside the plasma core. The essence of the approach is to eliminate from the signals the contribution of currents of poloidal field coils in the passive structures, while extracting the pure contribution from the plasma. Then the problem of reconstruction is reduced to adjusting the plasma fitting parameters to the resulting signals from the plasma. Passive conducting structure always represented the problem because of unpredictable eddy currents as well as 3-dimensional geometry, and 3-D perturbations on the local magnetic measurements, especially on short pulse devices like LTX- $\beta$  where decay time of eddy currents is comparable with plasma duration. The presentation explains how the method of Response Functions in combination with the numerical 3-D model of the passive structures, proposed here, resolves this problem and allows to eliminate from signals not only the contribution of the equilibrium coil currents and associated eddy currents, but also the contribution from the eddy currents excited by the plasma itself.

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