Improving the quality of the experimental reconstructions as the initial equilibrium state for the NIMROD code[1] JACOB KING, SCOTT KRUGER, Tech-X Corp, NIMROD TEAM — High quality equilibria are essential for extended-MHD modeling with the initial-value NIMROD code [Sovinec et al., JCP 195, 355 (2004)]. Typically the spatial resolution requirements for extended-MHD modeling, which must resolve singular-layer physics and highly anisotropic diffusion, are more stringent than the resolution of equilibrium reconstructions from experimental discharges. With the current workflow, reconstructed fields are mapped onto the NIMROD finite-element grid, and the disparity between the coarse resolution reconstruction and the fine resolution FE grid can create artificial small-scale artifacts. Extended-MHD modeling, which contains many high-order differential operators, can be corrupted by the mapping errors. We describe efforts to re-solve the Grad-Shafranov equation with open-flux regions using the NIMEQ solver [Howell and Sovinec, CPC 185, 1415 (2014)] to generate a new equilibrium while using the mapped results for both an initial guess and to specify the boundary conditions. Effects on computations with and without the re-solving for force balance will be described.

Jacob King
Tech-X Corp

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