Abstract Submitted
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**Reduced MHD model and simulations for advanced plasma control** SERGEI A. GALKIN, JESUS A. ROMERO, THE TAE TEAM, TAE Technology, Inc. — Current-vorticity MHD model has direct application to plasma control in the C-2W device [1]. The model and 2D code possesses remarkable features: written in the state space form dx/dt= f(x,t)+u(t) with voltage/current control input; semi-implicit time integration scheme with analytic/symbolic Jacobian and adaptive stepping; triangulation of computational domain including curving wall shape and adaptation if needed; flexible filtering technique restricting the frequency bandwidth to the bandwidth of control system interest; code is verified with 1D analytic solution and can run on coarse grid. Control system maintains macroscopic plasma parameters such as shape, position, elongation, etc. at prescribed values. The plasma model can be applied to control system design, training as well as to simulation and reconstruction of plasma parameters. Details of the model, its applications and simulations will be presented.
[1] H. Gota et al., Nucl. Fusion 59, 112009 (2019).

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