Abstract Submitted
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Non-linear dynamics of the wall touching kink mode and Hiro current simulation with DSC[1] S.A. GALKIN, V.A. SVIDZINSKI, E.G. EVSTATIEV, Far-Tech Inc., L.E. ZAKHAROV, PPPL — The Disruption Simulation Code (DSC) was initially implemented in 2D (single helicity) with all basic MHD components of the full 3D version. It performs adaptive, meshless free-boundary ideal one-fluid MHD simulations of plasma separated from conducting in-vessel structures by a vacuum region. Vacuum fields, the plasma surface and wall currents are calculated using both Green's functions and Poisson equation methods. Two non-linear regimes of the wall touching kink mode were simulated for the first time: (a) a fast ideal MHD regime till the saturation due to excitation of the Hiro currents in a tile covered plasma facing surface, and (b) a slower regime of the current quench due to resistive decay of the Hiro currents. Corresponding sideways forces applied to the plasma facing components and to the vacuum vessel were calculated. Progress on the 3D DSC extension of ideal one fluid MHD is presented. Implementation of the full 3D resistive MHD will be outlined. Together with realistic wall model this will enable DSC to address the MHD issues of the entire disruption problem and to move forward for understanding opportunities for mitigation and prediction of disruptions in ITER.

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