Abstract Submitted
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GTEDGE-2: A particle, momentum & energy conserving plasma transport code. E. W. DESHAZER, W. M. STACEY, Georgia Institute of Technology — We have reformulated fluid plasma transport theory to rigorously satisfy particle, momentum and energy conservation by: a) retaining long range E&M forces in the momentum balance in the derivation of a "pinch-diffusion" theory for the particle density [1]; b) taking into account the loss of plasma ions, momentum and energy by thermalized ions that access orbits that cross the separatrix and are "ion orbit loss" from the outflowing ion distribution [2]; c) incorporating these effects into the calculation of radial particle and energy fluxes and a rotation theory for toroidal and poloidal velocities [3]; and c) self-consistently modifying fluid plasma transport theory to incorporate these new effects and demonstrate their importance in the analysis of experiments [4,5]. The extended fluid transport formalism coupled to a 2D GTNEUT neutral particle transport code [6], which will provide a much improved edge pedestal analysis capability, introduces a need to modify the existing numerical iteration strategies. REFS: 1) Contr. Plas. Phys. 48, 94 (2008); 2) Phys. Plasmas 18, 102504 (2011); 3) Phys. Plasmas 20, 092508 (2013); 4) Nuc. Fus.57, 066034 (2017); 5) FS&T 75,251(2019); 6) Phys. Plasmas 13,062509 (2006) and 17, 022507 (2005).

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