

Abstract Submitted
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FDTD Ponderomotive Source Terms for BOUT++¹ DAVID SMITHE, Tech-X Corp, JAMES MYRA, Lodestar Research Corporation, ANDRIS DIMITS, MAXIM UMANSKY, LLNL — In the past, we have used a fast-time-scale / slow-time-scale approach to derive the vector Ponderomotive force in the slow-time-scale fluid equations, due to a fast-time-scale RF excitation. An issue that had remained unresolved, involving the appearance, and possible cancelation of the Reynolds Stress / Dynamic Pressure, e.g., the $\rho \cdot \mathbf{V} \cdot \mathbf{V}$ tensor, has finally been resolved. Proper accounting for the additional contribution to the slow-time-scale velocity distribution, when the distribution contains a cold fluid quiver [1], reestablishes the term, in its usual and familiar form. Progress has also been made in the computational implementation of these terms as additions into the SOLT3D code, making effective use of the generality of the BOUT++ framework [2] to facilitate the new physics. The properly normalized Ponderomotive vorticity term is concatenated to the other data files, in NetCDF format, after a run of the FDTD code. A simple one-line addition to the code reads that data in, and puts it into a global variable. Then the global variable is inserted into the vorticity equation. Compiling and testing of the modified SOLT3D code is ongoing. [1] P. J. Catto J. R. Myra, Phys Fluids B 1, 1193 (1989). [2] M. Umansky et al, CPC 180, 887 (2009).

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