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Core-edge coupling in Tokamak RF simulation via the multidomain pseudospectral method[1] D.L. GREEN, L.A. BERRY, E.F. JAEGER, ORNL, RF-SCIDAC TEAM — The primary uncertainty in heating Tokamak plasmas with RF power in the ICRF regime are the various linear and non-linear interactions of RF waves with the plasma edge. This will be of particular importance in ITER. The linear problem can be addressed by extending spectral full-wave core plasma calculations to the vessel wall. However, a uniform mesh of sufficient resolution to resolve the fine scale antenna features is not tractable for the core hot plasma calculation, even on todays peta-scale supercomputers. To retain all relevant physics the core plasma calculation requires a pseudospectral (or collocation) method (PSM). As such, here we investigate the implementation of the multi-domain (MD) PSM to achieve a variable mesh, device geometry matching and tractable runtime. While the MD-PSM has been successfully employed for simple dielectrics and interfaces[1], its application to a hot plasma is complicated by the non-local plasma current. This prevents implementation of the standard MD patching boundary conditions. Here we discuss these complications and present progress towards a MD all-orders core/antenna coupled simulation. [1] Q.H. Liu, IEEE Antenn. Wireless Popag. Lett., 1, 131-134, 2002

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