Abstract Submitted
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Recent progress from Simulation of Wave Interactions with MHD (SWIM)[1] DONALD BATCHELOR, ORNL, SWIM TEAM — The SWIM project consists of three elements. 1) A computational platform (the Integrated Plasma Simulator or IPS), that allows efficient coupling of the full range of required fusion modules, that is flexible, permits convenient user access and access to experimental data, and that is robust to evolving physics, code development, and computer hardware. 2) A physics campaign addressing long timescale discharge evolution in the presence of sporadic fast MHD events. This involves interfacing the IPS to the 3D non-linear extended MHD codes and carrying out a program of research on use of RF to study and control fast time-scale MHD phenomena. The primary focus being the understanding of how RF can be employed to optimize discharges and control sawtooth events. 3) A physics campaign for modeling the direct interaction of RF and extended MHD for slowly growing modes, the primary physics focus being to understand how RF can be used to control neoclassical tearing modes. The IPS will contain modules to calculate wave propagation and absorption in all relevant frequency regimes, modules to calculate the modification of the plasma velocity distribution from sources (RF, neutral injection and alpha particles), calculate profile and magnetic evolution, linear MHD stability models and reduced models of non-linear MHD events. The IPS design will be described and preliminary results presented.

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