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Importance of resonant wave-filament interactions for HHFW, helicon, and LH current drive in tokamaks[1] CORNWALL LAU, ELIJAH MARTIN, Oak Ridge National Laboratory, NICOLA BERTELLI, SYUN'ICHI SHIRAIWA, Princeton Plasma Physics Laboratory, WOUTER TIERENS, Max-Planck IPP, MICHAEL BROOKMAN, ROBERT PINSKER, BART VAN COMPERNOLLE, General Atomics, ABHAY RAM, GREG WALLACE, MIT Plasma Science and Fusion Center, ANDRIS DIMITS, Lawrence Livermore National Laboratory, JIM MYRA, Lodestar Research Corporation, STEVE VINCENA, UCLA , XIAOKANG YANG, TAE Technologies — A significant challenge in tokamaks is to demonstrate efficient current drive in advanced tokamak scenarios for steady-state operation of future reactors. Recent analytical work has hypothesized that the interaction of filaments with waves in the SOL of plasmas can create resonant wave-filament interactions that may lead to large SOL power absorption of waves and reduced current drive efficiency. The potential impact of these resonant wave-filament interactions on current drive schemes such as high harmonic fast waves on NSTX-U, helicon waves on DIII-D, and lower hybrid waves on Alcator C-Mod will be presented. Both the cylindrical analytical model and experimentally constrained toroidal full-wave computational models suggests that these resonant wave-filament interactions exist for the above-mentioned current drive schemes and may trigger large wave SOL losses in tokamaks. Future work to measure these resonant wave fields on the LaPD linear plasma experiment and current tokamaks will be discussed.

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