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Prospects for Off-axis Current Drive via High Field Side Lower Hybrid Current Drive in DIII-D[1] S.J. WUKITCH, S. SHIRAIWA, G.M. WALLACE, P.T. BONOLI, MIT PSFC, C. HOLCOMB, LLNL, J.M. PARK, ORNL, R.I. PINSKER, GA — An outstanding challenge for an economical, steady state tokamak is efficient off-axis current drive scalable to reactors. Previous studies have focused on high field side (HFS) launch of lower hybrid waves for current drive (LHCD) in double null configurations in reactor grade plasmas[P.T. Bonoli IAEA (2016)]. The goal of this work is to find a HFS LHCD scenario for DIII-D that balances coupling, power penetration and damping. The higher magnetic field on the HFS improves wave accessibility, which allows for lower $n_{||}$waves to be launched. These waves penetrate farther into the plasma core before damping at higher T_e yielding a higher current drive efficiency. Utilizing advanced ray tracing and Fokker Planck simulation tools (GENRAY+CQL3D), wave penetration, absorption and drive current profiles in high performance DIII-D H-Mode plasmas were investigated. We found LH scenarios with single pass absorption, excellent wave penetration to r/a 0.6-0.8, FWHM r/a=0.2 and driven current up to 0.37 MA/MW coupled. These simulations indicate that HFS LHCD has potential to achieve efficient off-axis current drive in DIII-D and the latest results will be presented.

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