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LHCD Simulation Using Full-Wave/Fokker-Planck Iteration[1]
SAMUEL FRANK, Massachusetts Institute of Technology MIT, JUNGPYO LEE, Hanyang University, JOHN WRIGHT, PAUL BONOLI, Massachusetts Institute of Technology MIT — Lower Hybrid Current Drive (LHCD), has been used as an efficient means of RF current drive and heating in tokamaks for approximately 40 years. However, in the weakly damped regimes present in most tokamak LHCD experiments, the raytracing/Fokker-Planck (FP) simulations of LHCD typically used to interpret experiments have had difficulty accurately predicting current drive efficiency and profiles precisely. One possible reason for the discrepancy present in these simulations may be the omission of full-wave effects such as interference or the breakdown of the WKB approximation. This work is focused on resolving these discrepancies and introduces an improved version of the high-performance full wave code TORLH coupled to the CQL3D FP code. The requirements for achieving good coupling and a stable iteration between the two codes are significantly more stringent than previously assumed, and their study has demonstrated the importance of previously overlooked timescales in the LHCD problem and given insight into the LHCD velocity gap problem. The implications of these results with respect to raytracing and full-wave Fokker-Planck modeling of LHCD will be discussed.

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