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Towards the modeling of ICRH using the delta-f particle-in-cell method in RZ geometry[1] TRAVIS AUSTIN, DAVID SMITHE, VAHID RANJBAR, MATT WROBEL, Tech-X Corporation — The delta-f particle-in-cell (DFPIC) method is a PIC method with a high signal-to-noise ratio which has been used for modeling electron Bernstein waves and ion cyclotron fast waves. It offers the capacity to model particle behavior such as multiple pass resonance, banana orbits, and superadiabaticity. It presents an alternative to linear wave codes like AORSA and TORIC which include only first-order parallel and perpendicular gradient variations of cyclotron frequency. Here we explore the use of the DFPIC method in the VORPAL computational framework for ion cyclotron resonance heating in RZ geometries based on eqdisk fusion data. We also consider the coupling to the bounce-averaged nonlinear Fokker-Planck code, CQL3D, through the generation of quasi-linear diffusion coefficients using a novel approach based on the DFPIC method. A benchmarking of the quasi-linear diffusion coefficients generated with the DFPIC method will be presented in 1D.

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