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Global Guiding-Center Particle Simulation of minority ICRH heated Plasmas in a Tokamak JAE-MIN KWON, Princeton Plasma Physics Laboratory, U.S.A. and Korea National Fusion Research Center, Korea, C.S. CHANG, S. KU, Courant Institute, New York University, New York, U.S.A., D. MCCUNE, C.K. PHILLIPS, Princeton Plasma Physics Laboratory, Princeton, NJ, U.S.A. — A global numerical simulation of RF heating of a multi-species kinetic plasma has been performed using a particle-in-cell guiding center code in tokamak geometry. The resonant minority ion species interacts with a prescribed rf wave and with the main ions, collisionally exchanging momentum and energy. The majority ions interact with each other collisionally (conserving momentum and energy) and with the minority ions. Generation of a global radial electric field and plasma rotation are evaluated self-consistently with the rf interaction and Coulomb collisions. It is found that the RF-driven radial transport can induce radial electric field and rotation profiles that significantly exceed the conventional neoclassical level for moderate RF-power. High field side heating produces a significantly greater flow shear than central and low field side heating in these simulations. Finite orbit excursion effects play an important role in producing these results. Detailed analysis of the observed phenomena using the time evolution of ion distribution functions will be presented. Coupling with a wave code and application of the technology to the NUBEAM Monte Carlo code will also be discussed.

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