Self-consistent ICRH modeling

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A robust code, SELFO-light, for self-consistent routine calculations of the power deposition and distribution functions of the resonant ion species has been developed for ICRH. The code uses the full wave code LION for calculating the wave field and a 1D time dependent FEM Fokker-Planck solver for calculating the pitch angle averaged distribution functions of the resonant species. The Fokker-Planck code includes sources and sinks to allow modeling of heating of NBI and fusion products. A formula benchmarked for ICRH is used to calculate the parallel temperatures of the ions. Self-consistency is obtained by modifying the susceptibility tensors of the resonant ion species used in the wave code to be consistent with the changes in the pitch angle and flux surface averaged distribution functions and changes in their parallel temperatures. The flux surface averaged quasi-linear operators used in the Fokker-Planck code are calculated from the wave fields.