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Fullwave coupling to a 3D antenna code using Green's function formulation of wave-particle response. JOHN WRIGHT, PAUL BONOLI, MIT-PSFC, MARCO BRAMBILLA, Max-Planck Institute for Plasma Physics, VITO LANCELLOTI, RICCARDO MAGGIORA, Politecnico diTorino , MARK CARTER, ORNL, RF-SCIDAC TEAM — Using the fullwave code, TORIC ,and the 3D antenna code, TOPICA, we construct a complete linear system for the RF driven plasma. The 3D finite element antenna code, TOPICA, requires an admittance, $\mathbf{Y}$, for the plasma, where $B = Y \bullet E$. In this work TORIC was modified to allow excitation of the (Eη, Eζ) electric field components at the plasma surface, corresponding to a single poloidal and toroidal mode number combination (m,n). This leads the tensor response: $Y = \begin{pmatrix} Y\eta\eta \& Y\eta\zeta \\ Y\zeta\eta \& Y\zeta\zeta \end{pmatrix}$, where each of the Yn submatrices is Nm in size. It is shown that the admittance matrix is equivalent to a Greens function calculation for the fullwave system and in addition, the net work done in the calculation is on the order of twice a single fullwave calculation. After the admittance calculation is done, the response of a plasma to an antenna driven at a given frequency can be calculated by only running the TOPICA code for a new antenna geometry. In tests of loading, TOPICA has been able reproduce loading of the Alcator D antenna (S12 coefficient accurately.).

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