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Modeling Electron Cloud Buildup and Microwave Diagnostics using VORPAL

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We present an overview of recent electron cloud modeling results using the multi-dimensional, parallel, plasma simulation code VORPAL. We have used VORPAL to model cloud buildup in dipole, quadrupole, and field-free magnetic field configurations, in both circular and elliptical cross section pipes relevant to microwave diagnostics at the PEP-II experiment at SLAC, and ongoing experiments in the Main Injector at Fermilab. In addition, we present preliminary results for modeling electron orbits in the CesrTA wiggler, which is the beginning of a more detailed modeling effort to understand electron cloud effects in electron/positron accelerators, as well as connecting microwave side-band measurements to cloud densities. We also report on recent 3-Dimensional microwave transmission simulations through uniform and non-uniform clouds, and with higher order TE and TM waves using VORPAL.

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