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**Numerical simulation of microwave transmission in the presence of an electron cloud** KIRAN SONNAD, LBNL, SETH VEITZER, PETER STOLTZ, Tech-X Corporation, MIGUEL FURMAN, LBNL, JOHN CARY, Tech-X Corporation — Electron cloud effects on the transmission of microwaves through beam pipes in the CERN SPS experiment and the PEP-II Low Energy Ring (LER) at SLAC have been recently observed. Electrons within the vacuum chamber generated primarily via secondary electron emission have been observed to cause a phase shift in microwaves injected into the vacuum chamber. Understanding this effect may provide a useful diagnostic tool for measuring electron cloud densities in accelerators. We present numerical simulation results generated by the electromagnetic Particle-In-Cell (PIC) code VORPAL, which predicts this phase shift. We also measure the effects of non-uniform electron cloud density and externally applied magnetic fields on the transmission properties, and compare our predictions to recent experiments at the PEP-II LER.

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