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Hall Effect Measured Using a Waveguide Tee JOYCE COPPOCK, JAMES ANDERSON, Dept. of Physics, University of Maryland, College Park, WILLIAM JOHNSON, Laboratory for Physical Sciences, College Park, Maryland, 20740 — We describe a simple microwave apparatus to measure the Hall effect in semiconductor wafers. The advantage of this technique is that it does not require contacts on the sample or the use of a resonant cavity. Our method consists of placing the semiconductor wafer into a slot cut in an X-band waveguide tee, which lies in the center of an electromagnet, injecting power into the two opposing arms of the tee, and measuring the output at the third arm. Application of a magnetic field gives a Hall signal that is linear in the magnetic field and which reverses phase when the magnetic field is reversed. This method yields the semiconductor mobility, which we can compare for calibration purposes with mobility data from direct-current (Van der Pauw[1]) measurements. We are in the process of modeling the system using a finite-difference time-domain (FDTD) simulation to better understand the behavior of the electric fields inside the sample. Resistivity data is obtained by measuring the microwave reflection coefficient of the sample. This talk presents data for silicon and germanium samples doped with boron or phosphorus. Measured mobilities ranged from 270-3000 $\frac{cm^2}{V \cdot s}$. [1]L. J. van der Pauw, *Philips Research Reports* 13, 1 (1958)

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