

## **Elimination of Radio-Frequency Noise by Identifying and Diverting Large RF Ground Currents**

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The problem of electromagnetic interference in scientific instruments is compounded for high-power plasma experiments by the large currents and voltages as well as by the broad bandwidths of the instruments. Ground loops are known to allow stray magnetic fields to drive large ground currents that can induce spurious signals and damage electronics. Furthermore, even when a ground loop is broken, capacitive coupling can still permit the flow of radio-frequency current, resulting in high-frequency spurious signals that can overwhelm the desired signal. We present the effects of RF ground loops on the output of vacuum photodiodes used in the Caltech Solar Loop Experiment and demonstrate the elimination of the spurious signals by diverting the ground currents away from the most vulnerable point of the signal line. Techniques for identifying the RF ground loops are also discussed. These techniques should be valuable in many high-power systems where interference from spurious coupling is an issue.