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**Measuring the Surface Charge on an Insulated Sample in Vacuum** JESSE HAYES, JOSHUA HODGES, RYAN HOFFMAN, J.R. DENNISON, Utah State University Physics Department — We describe the results of a project to design, build, calibrate and test a system to measure the surface charge on an insulator as a function of time and position in situ in a vacuum chamber. In our system, surface charge is created when an insulator is bombarded by fast moving electrons, creating secondary electrons which are emitted from the material. Deposited charge dissipates on relatively long time scales by charge transport through highly resistive materials. The ultrahigh vacuum system uses a capacitive sensor acting as an electrostatic field transfer probe and an external electrostatic field probe to measure the surface voltage. The probe can measure a wide range of surface voltage, is very compact, and can be swept across the sample using an in vacuo stepper motor to measure charge distribution. We describe measurements to characterize the stability, sensitivity, accuracy, range, spatial resolution and temporal response of the surface charge measurable by our system. Applications to studies by our group of electron emission from insulators and conductivity, as well as spacecraft charging, are also discussed.

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