Abstract Submitted
for the 4CF07 Meeting of
The American Physical Society

Investigating the Photoyield of Spacecraft Materials JENNIFER ALBRETSEN, RYAN HOFFMANN, JOHN R. DENNISON, USU Physics — Understanding the photon-induced charging of spacecraft materials is necessary in modeling the overall charging of a spacecraft. Measuring the photoyields of insulators requires sophistication, since insulators' electrons must overcome a greater potential energy barrier, than electrons in a metal, to move within a solid. In order to determine the photoyields of insulating and semiconducting materials for NASA's Solar Probe Mission (PBN, Alumina) and James Webb Space Telescope project (SixPI-ExVDA), a chopper and lock-in amplifier were added to a photoyield measurement system. A standard (Au) photoemission spectrum was compared with Au spectrum taken before addition of the lock-in to verify the validity of the modified system. Two insulators (polyboron nitride and Alumina) under investigation for the NASA/APL Solar Probe Mission and materials for the JWST project (vapor deposited aluminum and silicon on substrate Kapton E) were then studied using the modified photoemission measurement system. The resulting spectra were used to calculate the solar photoelectron yield and work function of each of the materials.

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Date submitted: 17 Sep 2007 Electronic form version 1.4