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Experimental Simulation of Solar Wind Interactions with Magnetic Dipole Fields above Insulating Surfaces[1] TOBIN MUNSAT, JAN DECA, JIA HAN, MIHALY HORANYI, XU WANG, GREG WERNER, LI HSIA YEO, University of Colorado, DOMINIC FUENTES, California State University, East Bay — Magnetic anomalies on the surfaces of airless bodies such as the Moon interact with the solar wind, resulting in both magnetic and electrostatic deflection of the charged particles and thus localized surface charging. This interaction is studied in the Colorado Solar Wind Experiment with large-cross-section (∼300 cm^2) high-energy flowing plasmas (100-800 eV beam ions) that are incident upon a magnetic dipole embedded under various insulating surfaces. Measured 2D plasma potential profiles indicate that in the dipole lobe regions, the surfaces are charged to high positive potentials due to the collection of unmagnetized ions, while the electrons are magnetically shielded. At low ion beam energies, the surface potential follows the beam energy in eV. However, at high energies, the surface potentials in the electron-shielded regions are significantly lower than the beam energies. A series of studies indicate that secondary electrons are likely to play a dominant role in determining the surface potential. Early results will also be presented from a second experiment, in which a strong permanent magnet with large dipole moment (0.55 T, 275 A*m^2) is inserted into the flowing plasma beam to replicate aspects of the solar wind interaction with the earths magnetic field.

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