

Abstract Submitted  
for the DPP11 Meeting of  
The American Physical Society

**Effects of Na<sup>+</sup> and He<sup>+</sup> pickup ions on the solar wind - Moon interaction: 3D hybrid modeling** ALEXANDER LIPATOV, Goddard Planetary and Heliophysics Institute, University of Maryland Baltimore County, JOHN COOPER, EDWARD SITTLER, RICHARD HARTLE, NASA Goddard Space Flight Center — The hybrid kinetic model used here supports comprehensive simulation of the interaction between different spatial and energetic elements for the Moon, solar wind, and Earth magnetosphere in the Earth-Moon system. Computational capabilities exist for MHD, kinetic, hybrid, drift kinetic, electrostatic and full kinetic modeling of the Lunar plasma environment. However, observations show the existence of several species of the neutrals and pickup ions like Na and He. The solar wind parameters are chosen for our work from ARTEMIS observations. The hybrid kinetic model allows us to take into account finite gyroradius effects of pickup ions and to estimate correctly the ions velocity distribution and the fluxes along the magnetic field. We will discuss the results of modeling, including separate species of pickup ions, (Na<sup>+</sup>, and He<sup>+</sup>) and their combinations. Modeling shows the formation of the asymmetric Mach cone, pickup ion tails, and another type of lunar-solar wind interaction.

John Cooper  
NASA Goddard Space Flight Center

Date submitted: 31 Aug 2011

Electronic form version 1.4