

Heerikhuisen Jacob

Jacob Heerikhuisen

Center for Space Plasma and Aeronomic Research, and Department of  
Physics  
University of Alabama in Huntsville  
301 Sparkman Drive  
Huntsville AL35899

### Kinetic Modeling of Interstellar Hydrogen in the Heliosphere

The heliospheric interface is created by the collision between the plasmas of the solar wind and local interstellar medium. The presence of Neutral Hydrogen significantly affects the resulting structures -- termination shock, bow shock and heliopause. Due to the large mean free paths, H-atoms must be modeled kinetically. We present results obtained from a model of the heliosphere that self-consistently couples the ion, modeled as MHD, and neutral, modeled kinetically, populations through charge-exchange collisions. The resulting neutral population is distinctly non-Maxwellian. We present predictions for NASA's IBEX mission which is currently detecting energetic neutral atoms from an eccentric Earth orbit. Details of the kinetic model, such as particle splitting, will be explained. Additionally we will describe procedures currently under development that will address time-dependence and ways to overcome difficulties in obtaining statistically accurate charge-exchange source terms for the MHD equations in places where the ion population changes rapidly