Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

**Characterization of hydrogen binding to tungsten and beryllium surfaces using low energy ion beam analysis**[1] ROBERT KOLASINSKI, JOSH WHALEY, Sandia National Laboratories, Hydrogen and Combustion Technology Department, Livermore, CA — In this study, we use low energy ion beam analysis to determine how hydrogen interacts with tungsten and beryllium surfaces. The goal of this work is to provide insight into processes that contribute to recycling from plasma-facing surfaces in magnetic fusion devices. Here we have applied low energy ion scattering (LEIS) to enable detection of adsorbed hydrogen at sub-monolayer resolution and to provide isotopic sensitivity. We probe the surfaces of interest with He+ and Ne+ at energies less than 5 keV to determine the structure and composition of the first few atomic layers. This approach enables us to examine how hydrogen surface concentrations evolve in real time, providing insight into adsorption kinetics. In addition, we have developed a means of determining the hydrogen binding configuration at different temperatures by exploiting mechanisms of ion channeling along surfaces. Using these methods, we have been able to identify hydrogen binding configurations for the W(100)+H, W(110)+H, and Be(0001)+H adsorption systems. We also report on our efforts to more accurately and efficiently model atomic collisions during scattering, key steps needed to extract structural information from LEIS signals.

[1]Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. DOE's National Nuclear Security Administration under contract DE-AC04-94AL85000.

Robert Kolasinski
Sandia National Laboratories

Date submitted: 24 Jul 2015 Electronic form version 1.4