Physics Colloquium

Friday September 14th, 2012
4:10 – 5:00 pm, EPS108

"Characterizing the atomic-scale behavior of hydrogen on metal surfaces"

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Abstract:

How hydrogen interacts with metal surfaces is a key problem that affects a variety of technologically important systems, including structural materials for hydrogen energy infrastructure, catalysts, and metal hydrides. To provide insight into some of the materials problems that arise in these applications, we use low energy ion scattering (LEIS), a surface analysis technique that is directly sensitive to hydrogen. In our recent work at Sandia, we applied LEIS to examine the atomic-scale behavior of hydrogen on single crystal surfaces in a carefully controlled, high-purity vacuum environment. Our basic experimental approach involves using an ion gun to bombard surfaces with He^+ and Ne^+ at energies < 5 keV. After detecting the scattered and recoiled particles, one can determine structure and composition of the first few atomic monolayers of a surface. In this talk, I will provide an overview of the physics that underlies LEIS, as well as some of our recent advances to directly detect adsorbed hydrogen without disturbing oxides or other native species. In addition, I will highlight our recent results that reveal the atomic-scale binding configuration of hydrogen to Be and Al, as well as our efforts to model atomic collisions that occur during scattering.

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Host:

Dick Smith

Refreshments 3:45 p.m.
EPS 2nd Floor Atrium