UNIVERSITY OF NOTRE DAME
DEPARTMENT OF PHYSICS

SPECIAL NUCLEAR SEMINAR

Monday, June 12

HS-LEIS analysis of the Outer Surface and Ultra-Thin Layers

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The composition of the outermost atomic layer of a material is generally fundamentally and radically different from that of the atoms below this surface. Precisely these outer atoms largely control many processes such as growth, nucleation, poisoning, adhesion and electron emission. While most analytic tools (such as XPS) probe an average of several or many atomic layers, High-Sensitivity Low Energy Ion Scattering (HS-LEIS) can selectively analyze the outer atoms. In addition, non-destructive in-depth information, with high depth resolution, is obtained for the heavier elements (0 - 10 nm). HS-LEIS is just as well suited for the quantitative analysis of amorphous, insulating and extremely rough surfaces as for flat single crystals. Since HS-LEIS is a fast analysis technique, it can be used to follow diffusion processes in-situ.

After an introduction of the technique, the focus will be on applications where valuable information has been obtained that is impossible (very difficult) to obtain with other analytical techniques. The new possibilities will be illustrated with a selection of examples from:

Growth
- ALD growth
- coverage/closure
- sensors

Microelectronics
- ultrathin
- diffusion barriers
- graphene

Mixed Oxides
- spinels
- perovskites
- fuel cells

Catalysts
- surface segregation
- poisoning
- core/shell nanoclusters

The findings will be compared and contrasted to those obtained by complementary analytic techniques such as XPS, Auger, SIMS, RBS, conventional LEIS and TEM.

4 pm – 5 pm

Nuclear Science Laboratory

124 Nieuwland Science Hall

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All interested persons are cordially invited to attend

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Refreshments will be served prior to the seminar in room 124