APS COLLOQUIUM SERIES

Speaker: Arthur J. Freeman
Northwestern University

Professor Arthur J. Freeman is Morrison Professor of Physics in the Department of Physics and Astronomy at Northwestern University. He is internationally recognized for his many fundamental contributions to our understanding of the electronic, magnetic and superconducting properties of condensed matter. He has served as Associate Laboratory Director and Head, Theoretical Physics Group, at the Francis Bitter National Magnet Laboratory at the Massachussetts Institute of Technology, and on the Advisory Boards of several important scientific journals. His many honors include receipt of the Guggenheim and Fulbright Fellowships, the Alexander von Humboldt Fellowship, the first Materials Research Society Medal, and the first I.U.P.A.P. Award in Magnetism. He was the Founding Editor of the Journal of Magnetism and Materials, and is a Foreign Member of the Academy of Natural Sciences of Russia, and of the Russian Academy of Sciences.

Title: Magnetism in Low Dimensions: Challenges and Opportunities at the Turn of the Century

The last two decades have witnessed an explosive growth in the science and technology of thin film and interface magnetism as a result of several revolutionary developments that have advanced the study of artificial magnetic materials: surfaces, interfaces, and superlattices (multilayers). Indeed, magnetism research and its technological applications are in a new golden age of excitement and discovery as a result of advances in ultra-high vacuum synthesis approaches, sophisticated characterization and property measurements--often centered around advanced synchrotron light sources--and development of highly precise computational/ theoretical methods. As is well known, first-principle electronic structure studies based on local spin density functional theory, and performed on extremely complex simulations of ever increasingly realistic systems, play a very important role in explaining surface and interface magnetism. Indeed, these advanced computational techniques, combined with existing and new computational power, already provide an understanding of magnetic materials and their properties at the atomic scale with an unprecedented level of detail and accuracy. This talk illustrates several exciting areas addressed recently, including magnetism, magnetic anisotropy, magnetostriction, magneto-optics (MCD and SMOKE), and magneto-transport (i.e., GMR).

DATE: Wednesday, June 2, 1999

TIME: 4:15 p.m.

LOCATION: Building 402, Auditorium