

CAPS COLLOQUIUM

Distinguished scientists in all disciplines are invited to lecture on topics of general interest. Objectives include the cross-fertilization of research initiatives at various institutions and the identification of possible uses of the Advanced Photon Source.

When: First Wednesday of each month at 3:00 p.m.

Where: Building 402, APS Auditorium

Refreshments served at 2:45 p.m.

Wednesday, August 6, 2003

John C. H. Spence

Regents Professor of Physics at Arizona State University

"Lensless Imaging in Materials Science and Biology"

John C. H. Spence is Regents Professor of Physics at ASU, a Fellow of the American Physical Society, winner of the Burton Award of the Electron Microscopy Society of America, and of an Alexander von Humboldt Senior Scientist Award in 1992. His research covers several areas of experimental solid state physics and materials science. He has developed four new scientific instruments, holds patents for three (superconductor lithography, the time-of-flight STM and extreme aspect ratio lithography), and is the author of over 270 publications in refereed physics journals.

Abstract:

Lensless imaging has been demonstrated with coherent electrons, X-rays, and visible light. This provides the capability for aberration-free, diffraction-limited imaging using particles for which no lenses exist, and addresses the depth-of-field problem in tomographic soft X-ray zone-plate microscopy. The most successful method is based on Shannon sampling of diffuse far-field scattering from an isolated object. The principle of the method will be outlined with examples of its application to soft X-ray imaging of 50nm gold balls and atomic-resolution imaging of a single nanotube by electron diffraction. This work raises many issues for the future of synchrotron science.

<http://www.aps.anl.gov/conferences/APSColloquium>