

Baltimore Press Conferences March APS Meeting

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Meeting epitome: meetings.aps.org/Meeting/MAR06/APS_epitome
Meeting virtual pressroom: <http://www.aps.org/meet/MAR06/baps/vpr.cfm>

AN EMBARGO EXTENDING TO THE
TIME OF THE PRESS CONFERENCE
APPLIES TO THE FOLLOWING
INFORMATION

Revised March 1, 2006-----The following press events will take place at the March Meeting of the American Physical Society (APS) at the Baltimore Convention Center. The pressroom will be in room 334, while all press conferences will be held in room 333.

Press Conference, Monday, March 13, 11:30 AM
GRAPHENE

One of the newest new things featured at this APS meeting is the prospective use of two-dimensional carbon sheets in next-wave microchips. Rolled into tubes (carbon nanotubes) or formed into ribbons or patterned planes, graphene is a marvelous platform for electrons, which are able to move about as if they had no mass. They move quickly, and suffer little energy dissipation even at room temperature. Electrons moving in a graphene plane constitute a 2D electron gas. Making smooth interconnections between separated devices on a chip might be easier with graphene, and exploitable novel quantum effects are expected. Philip Kim, Columbia Univ., paper D2.1 (pk2015@columbia.edu); Andrea Geim, Univ. Manchester, paper D2.2 (andre.geim@man.ac.uk); Walt de Heer, Georgia Tech, paper D2.4 (deheer@electra.physics.gatech.edu)

Press Conference, Monday, 2:00 PM

ENERGY COLLECTION, CONVERSION, AND CONSERVATION

Pollution, global warming, dwindling oil supplies, and the risks associated with relying on politically unstable regions of the world for our energy needs are making it abundantly clear that we must seriously consider alternative sources of energy. Sara Kurtz (sarah_kurtz@comcast.net, 303-384-6475) of the National Renewable Energy Laboratory ponders new, high efficiency solar collectors as an answer to some of our energy needs. The technology looks likely to double the performance of existing solar-energy systems (G5.2). Mercuri Kanatzidis (kanatzidis@chemistry.msu.edu, 517-355-9715 ext. 174,) of Michigan State University, on the other hand, is considering new materials that allow the direct conversion of heat to electricity. Most thermoelectric devices are relatively inefficient, but novel nanostructured materials promise to raise efficiencies to the point that the devices may soon be competitive with other energy sources(A5.2). Fred Schubert (EFSchubert@rpi.edu, 518-276-8775) of Rensselaer Polytechnic Institute is approaching the energy problem from an entirely different angle. He is developing highly efficient LEDs that will radically reduce the power required for various optical and ultra violet light sources (A5.5).

Press Conference, Tuesday, March 14, 9:30 AM

PHYSICS AND ART

Two distinguished condensed matter physicists will recount their involvements in the arts. Charles Falco, Univ. Arizona, paper H4.2 (falco@u.arizona.edu) will update the controversial theory, advanced in collaboration with the painter David Hockney, to the effect that some Renaissance painters used optical devices in achieving certain “realistic” effects. Falco also curated a notable exhibit at the Guggenheim Museum in New York devoted to motorcycles. Brian Schwartz, City Univ. New York, paper H4.3 (bschwartz@gc.cuny.edu) helps promote science-themed theater. He will discuss his involvement with productions of “Copenhagen” (by Michael Frayn) and “Einstein’s Dreams” (based on the novel by physicist Alan Lightman), and is undertaking a funded program to initiate connections between science and theater departments at colleges.

Press Conference, Tuesday, March 14, 11:30 AM

PLASMONICS

Like the study of graphene, the study of electromagnetic waves in metallic surfaces (surface plasmons) as a distinct research area has been accelerating rapidly. Basically, physicists hope to combine the huge data-carrying and processing rates one gets with photonics with the tiny packaging and versatility of electronics. The resulting discipline is called plasmonics. Other things one can do with plasmonic excitations: achievement of “perfect lensing” on a chip, creation of plasmon-based nanoparticle biosensors, and development of electronic circuits that can operate at optical frequencies (10^{15} Hz). Naomi Halas, Rice Univ., P36.4 (halas@rice.edu); Gennady Shvets, Univ. Texas, G16.4 (gena@physics.utexas.edu); Igor Smolyaninov, Univ. Maryland, P36.1 and P36.2 (smoly@eng.umd.edu); Nader Engheta, Univ. Pennsylvania, G16.9 (engheta@ee.upenn.edu).

Press Conference, Tuesday, 2:30 PM

NEW FORM OF SUPERFLUIDITY?

Rice and MIT researchers will present ongoing experimental investigations of an unusual superfluid phenomenon in ultracold atomic gases, namely those made of fermion atoms, i.e., those atoms with an odd number of total constituents (protons, electrons, neutrons). Because fermions are one of the major classes of matter, the new research may bear on diverse phenomena ranging from superconductivity to the dense quark matter at the cores of neutron stars. By observing superfluid vortices in an ultracold gas of lithium-6 atoms, Martin Zwierlein and his colleagues at MIT (zwierlei@MIT.EDU) have directly shown that superfluidity---the lack of friction in the gas---persists even if it is composed of an unequal mixture of spin-up and spin-down atoms (which correspond, very roughly speaking, to atoms having bar magnets pointing up and other atoms having bar magnets pointing down). The persistence of superfluidity runs counter to basic theories which suggest that such an unequal mixture would create magnetic effects spoiling the frictionless effect. At even more unequal mixtures of spin-up and spin-down lithium-6 atoms, Randy Hulet (randy@rice.edu) and his colleagues at Rice University have found that the excess spin particles are no longer tolerated and are suddenly expelled from a uniform core (for which they report indirect evidence of being superfluid) to a surrounding shell containing the excess unpaired atoms (Papers D43.4 and N6.3). The nature of these new states are quite enigmatic---and may provide insights into recent sightings of superconductivity in heavy-fermion materials that exhibit a spin imbalance. Theorist Eugene Demler of Harvard (demler@cmt.harvard.edu) will provide commentary on these latest experiments.

Press Conference, Wednesday, 10 AM

FOUNDATIONS OF EVOLUTION

Physicists are developing new tools for testing biological evolution at a much deeper level than was possible 20 years ago. Robert Austin of Princeton (austin@princeton.edu) will provide an introduction to an entire APS session (R7) dealing with this topic. Daniel Fisher of Harvard (fisher@physics.harvard.edu) will discuss efforts to explore evolutionary dynamics in a quantitative fashion through the combination of microbial experiments and theory. The University of Chicago's Jim Shapiro (jsha@uchicago.edu) will explain that an information-science approach is bound to offer many new details about evolution. As he points out, the results of 50 years of molecular biology research have demonstrated that the genome is not a passive blueprint, but rather a complex information-processing unit, and that cells have "natural genetic engineering tools" for restructuring DNA molecules. Using nano- and micro-fabrication technology to create habitable landscapes for E. Coli bacteria populations, speaker Juan Keymer and his colleagues at Princeton University (keymer@Princeton.edu), are exploring how spatial factors such as the destruction of habitat (induced by ultraviolet light) shape the organisms' evolution.

Press Conference, Wednesday, 11:30 AM

IS THE US LOSING THE LEAD IN SCIENCE AND TECHNOLOGY?

The US is indeed in peril of falling behind European and Asian countries in science and tech, according to recently compiled competitiveness benchmarks. Michael Lubell of the City College of New York and Director of Public Affairs at APS (lubell@scisun.sci.ccny.cuny.edu, 212- 650-5610) will discuss some of the reasons for nation's sliding status, as well as policy changes that might help the US stay in the forefront of science and technology (N5.4). Charles Duke (aed22cbd@frontiernet.net, 585-872-2243) of the Xerox Center for Research and Technology will explain how changes in the R&D environment since 1990 have hurt US competitiveness, and describe ways that private firms are modifying their R&D activities to deal with the changes (N5.1).

Press Conference, Wednesday, 1:30 PM

NANOPORES FOR DNA SEQUENCING AND ANTHRAX DETECTION

Some of the hottest biophysics talks at the meeting deal with “nanopores,” nanometer-scale openings that occur naturally in proteins, for example to shuttle biochemical ions between nerve cells, that can be made artificially with the latest tools of nanotechnology. Researchers will discuss breakthroughs in developing both natural and artificial nanopores for such applications as faster and cheaper DNA sequencing as well as new ways of detecting anthrax. To provide faster DNA sequencing than exists with biochemical methods, DNA would traverse through the pore, and in one scenario the change in ion flow as DNA moves through would yield the sequence of bases in the DNA. A Brown University group led by Sean Ling (Xinsheng.Ling@brown.edu) will describe one solution to reading the individual letters of DNA molecules through nanopores even though the bases are only 4 angstroms apart (N26.10), as well as making addressable nanopores on chips (N26.1). Cees Dekker of the Delft University of Technology (dekker@mb.tn.tudelft.nl) will discuss his group's latest work with artificial nanopores (H7.2). NIST's John J. Kasianowicz (john.kasianowicz@nist.gov), the researcher who first proposed using nanopores for DNA sequencing ten years ago, will also show that the nanopore of a protein secreted by anthrax may provide the basis of new technologies for quickly detecting anthrax in blood samples, measuring the levels of toxins in the body, and studying the effectiveness of therapeutic agents that fight anthrax (H7.1).

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