

APS meets in Las Vegas

APS will honor 13 physicists with awards and will offer 50 invited sessions.

The American Physical Society will hold its March meeting this year in Las Vegas, Nevada, from 31 March to 4 April, with the MGM Grand Hotel serving as the headquarters. Registration will be held on Sunday, 30 March, from 1 pm to 9 pm; on Monday from 7:30 am to 5 pm; on Tuesday from 8 am to 5 pm; on Wednesday and Thursday from 8 am to 4 pm; and on Friday from 8 am to noon.

APS will sponsor a cocktail party on Monday evening from 6 pm to 7:30 pm in the hotel's Grand Salon. The Committee on the Status of Women in Physics will sponsor a coffee hour on Tuesday afternoon from 3 pm to 5 pm. On Wednesday afternoon the Division of Chemical Physics will host a reception for its members, beginning at 5 pm. The Forum on Physics and Society will sponsor a trip to the Department of Energy's Nevada Test Site.

The American Institute of Physics will conduct a free on-line training workshop for individuals who wish to learn how to use *Physics Briefs*, the comprehensive physics database available on the scientific and technical network STN International. The workshop will be held on Tuesday evening from 6 pm to 8 pm; a wine and cheese reception will follow.

Invited sessions

The five-day program features 50 invited sessions. The APS Division of Condensed-Matter Physics has organized 17 full-length invited symposia, which will discuss the following topics: the fractional quantum Hall effect, surface reactions, band offsets, heavy electrons, epitaxial films, quasicrystals, vector percolation, electrolyte-solid interfaces, wetting and flow,

quantum transport in small systems, strained-layer superlattices, magnetism in thin layers, two-dimensional and spin-polarized He, heavy-fermion superconductors, exotic and vivacious liquid-crystal phases, localized excitations in solids and time-resolved optical probes of electron heating. In addition, the division will host a new-materials prize session (Tuesday afternoon) and six mini-symposia, whose topics will be the kinetics of ordering and phase separation, Si surface reconstruction, monolayers on graphite, optical properties of semiconductors, core-level spectroscopy and superconductivity at the two-dimensional threshold.

The Divisions of Chemical Physics and Biological Physics have arranged two joint symposia: on structural and energetic aspects of light-induced water splitting and on the physics of medical nmr imaging. Independently, the Biological Physics division will offer a symposium on the search for a consistent picture of DNA dynamics. The Chemical Physics division will offer the following symposia: nontraditional approaches in magnetic resonance, nmr studies of surfaces, advances in electron-spin resonance, magnetic resonance in systems of low dimensionality and applications of nmr to current problems in physics. In addition to its regular sessions the Division of High-Polymer Physics will sponsor a symposium in tribute to Paul J. Flory.

The APS Division of Fluid Dynamics will host the following three invited symposia: instabilities and multicritical points in nonequilibrium systems, pattern formation from instabilities and vortex dynamics in superfluids and classical fluids. The Division of Elec-

tron and Atomic Physics will offer two symposia: on physics and clusters, and on charge transfer in ion-surface collisions.

The Committee on Applications of Physics has arranged six sessions: fundamental limits, the physics and geometry of sedimentary rocks, the physics of VLSI, process technology, defects in silicon, the physics of high-speed transistors and the physics of x-ray imaging. The Division of History has organized a session on the history of applied physics, and the Committee on Education has organized a session on frontiers in physics education. The newly formed Instrument and Measurement Science Topical Group and Materials Physics Topical Group have also organized symposia for the meeting.

The Society of Physics Students has arranged two invited lectures—"The physics of musical instruments," by Edgar A. Pearlstein, and "Adventures at high magnetic fields and low temperatures: New states of matter?" by James Brooks—which will take place on Wednesday and Thursday, respectively.

Ceremonial session

At its ceremonial session on Tuesday afternoon, The American Physical Society will honor several individuals with awards.

Harmut Michel and Johann Deisenhofer, both of the Max Planck Institute for Biochemistry in Martinsried, FRG, will receive the Biological Physics Prize for their "pioneering structural determination at atomic resolution of the complete membrane-bound photosynthetic bacterial reaction center of *Rhodospseudomonas viridis*. Their astounding discovery that a functional assem-

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lage of membrane proteins can be crystallized opens up an entire new area of structural biophysics." Michel, a member of the department of membrane biochemistry, was responsible for much of the experimental work on the project; Deisenhofer, a member of the protein-crystallography group of R. Huber, made essential contributions in the analysis of data and the construction of models. After succeeding in crystallizing the photosynthetic reaction center of *Rhodospseudomonas viridis* (1982), Michel collaborated with W. Zinth and W. Kaiser in 1983 to demonstrate that the crystallized center retained its photochemical capabilities. In 1984 Michel, Deisenhofer and their collaborators obtained an electron-density map of the center, in which they attained a resolution of 3 Å, that allowed them to explain its spectroscopic properties in terms of its structure. Michel used recombinant DNA methods to identify the amino acid

sequence of the polypeptides involved (1985); that same year he, Deisenhofer and their collaborators succeeded in solving the structure.

Robert B. Laughlin (Lawrence Livermore National Laboratory) will receive the Oliver E. Buckley Prize for his "contribution to our understanding of the quantized Hall effect." After receiving his PhD from the Massachusetts Institute of Technology in 1979, Laughlin worked at Bell Laboratories in Murray Hill, New Jersey, before becoming a research physicist at Livermore. In 1984 Laughlin received the E. O. Lawrence Award of the Department of Energy for his elucidation of the quantized Hall effect (see *PHYSICS TODAY*, December 1985, page 89, which contains a detailed description of his work).

André J. Kovacs (CNRS-ULP, Centre de recherches sur les macromolécules) will receive the High-Polymer-Physics Prize for his "pioneering studies of the

relaxation of polymeric glasses and of the relationship between growth and morphology of polymer crystals." In the early 1950s Kovacs conducted the definitive experiment on the time dependence of isothermal volume changes that follow abrupt changes in temperature near the glass-transition temperature in polymer glasses. In the early 1960s he and his collaborators studied the effects of this isothermal volume contraction on shear relaxation times and on shear creep time scales; these studies culminated in 1963 in his classic review article on structural recovery in polymer glasses. Kovacs spent the next 12 years studying polymer crystal growth in polyethylene oxide homopolymers and block copolymers. In the mid-1960s he and his collaborators showed that discontinuities in the growth rate of these crystals originated from quantized transitions in the thickness of the lamellae corresponding to extended, once-, twice- or

Invited papers and special sessions

MONDAY

Morning

Symposium of the Division of Condensed-Matter Physics: Fractional quantum Hall effect. *R. B. Laughlin, S. Girvin, G. Bobinger, S. A. Kivelson, D. Haldane*

Symposium of the Division of Condensed-Matter Physics: Surface reactions. *T. H. Ellis, G. B. Fisher, G. L. Kellogg, M. Shayegan, M. Ronay*

Symposium of the Divisions of Biological and Chemical Physics: Structural and energetic aspects of light-induced water splitting. *E. Greenbaum, A. Heller, M. P. Klein, M. Gratzel*

Symposium of the Division of Fluid Dynamics: Instabilities and multicritical points in nonequilibrium systems. *Knobloch, Surko, G. Ahlers, M. Golubitsky, H. Swinney*

Symposium of the Committee on Applications in Physics: Fundamental limits. *G. Binnig, R. W. Keyes, D. Meindl, R. S. Berry, D. Kleppner*

Materials physics: Quasicrystals. *R. Schaefer*

Scanning tunneling microscopy. *R. M. Feenstra*

Glasses and glassy behavior in crystals. *P. D. Vashishta*

Amorphous silicon: Mostly structure. *J. E. Graebner*

Modulation and field spectroscopies of superlattices. *O. J. Glembocki*

Electronic structure methods. *R. E. Watson*

Crystalline polymers. *Porter*

afternoon

Symposium of the Division of Condensed-Matter Physics: Band offsets. *F. Capasso, C. B. Duke, J. Tersoff, G. Margaritondo*

Symposium of the Division of Condensed-Matter Physics: Heavy electrons. *J. W. Wilkins, F. Steglich, Z. Fisk, K. Ueda, A. J. Arko*

Symposium of the Division of Condensed-Matter Physics: Epitaxial films. *W. F. Egelhoff, S. Y. Tong, G. A. Prinz, T. W. Capehart, G. P. Felcher*

Symposium of the Division of Fluid Dynamics: Pattern formation from instabilities. *H. Greenside, M. Heutmaker, H. Levine, A. Pocheau, B. Shraiman*

Symposium of the Committee on Applications of Physics: Physics and geometry of sedimentary rocks. *J. R. Banavar, L. P. Kadanoff, A. H. Thompson, H. J. Vinegar*

Materials physics: Quasicrystals. *Follstaedt*

Device physics and technology. *R. S. Sorbello*

Low-dimensional systems and wetting. *M. P. Nightingale*

Charge density wave conductors. *Bardeen*

Semiconductors: Deep levels. *D. J. Wolford*

Dillon Medal: Theory. *M. Muthukumar*

evening

Symposium of the Instrument and Measurement Science Topical Group. *E. D. Wolf, J. Schirber, P. L. Richards, G. L. Miller*

TUESDAY morning

Symposium of the Division of Condensed-Matter Physics: Quasicrystals. *S. Troian, V. Elser, Poon, M. V. Jaric, P. Bancel*

Symposium of the Division of Condensed-Matter Physics: Vector percolation. *M. F. Thorpe, L. Bengigui, P. Sen, Pase, S. Alexander*

Symposium of the Division of Biological Physics: Prize symposium: Structural basis and kinetics of light reactions in photosynthetic bacteria. *H. Michel, J. Deisenhofer, G. Feher, J. R. Norris, D. Holten*

Symposium of the Division of Fluid Dynamics: Vortex dynamics in super and classical fluids. *K. Schwartz, J. Tough, E. Siggia, P. S. Marcus*

Symposium of the Committee on Applications of Physics: Physics of VLSI—process technology. *E. W. Plummer, G. S. Oehrlein, L. C. Feldman, K. L. Wang, J. G. Fossum*

Materials physics: Molecular dynamics. *R. Car*

Materials physics: Pattern formation. *M. Glicksman*

Surface scattering. *M. J. Cardillo*

Superconductivity: Transition-metal nitride films. *D. W. Capone*

Fractional quantization. *C. Kallin*

Heterostructures: Quasiperiodic, Raman, n-i-p-i. *R. Merlin*

Ford Prize symposium. *A. J. Kovacs, McKenna, Robertson, Keller, Hadzioannou*

afternoon

Ceremonial session. *J. K. Galt*

Symposium of the Division of Condensed-Matter Physics: New-Materials Prize session. *J. J. Croat, J. F. Herbst, M. Sagawa, N. C. Koon*

Symposium of the Division of Condensed-Matter Physics: Electrolyte-solid interfaces. *D. E. Aspens, T. E. Furtak, S. E. Lambert, S. Pons, Y. R. Shen*

Symposium of the Division of Chemical Physics: Nontraditional approaches in magnetic resonance. *T. Sleater, A. Pines, J. Jonas, R. R. Ernst*

Symposium of the Instrument and Measurement Science Topical Group. *Hirschfeld, S. Faris, K. Wickersheim, S. Cheung*

Symposium of the Committee on Applications of Physics: Physics of VLSI—defects in silicon. *S. Pantelides, A. Ourmazd, E. Webber, S. A. Lyons, R. A. Craven*

Materials physics: Molecular dynamics. *Doll*

Semiconductor interfaces. *J. Werner*

Semiconductor surfaces. *F. Sette*

Superconducting tunneling. *D. B. Schwartz*

Symposium of the Division of High Polymers Physics: Tribute to P. J. Flory. *Mark, Helfand, R. S. Berry, Boyd, Khoury*

WEDNESDAY morning

Symposium of the Division of Condensed-Matter Physics: Wetting and flow. *Frank, L. P. Kadanoff, E. Ben-Jacob, S. K. Sinha, P. S. Pershan*

Symposium of the Division of Condensed-Matter Physics: Quantum transport in small systems. *W. Skocpol, S. Washburn, A. D. Stone, D. E. Prober*

thrice-folded chains. Kovacs subsequently developed methods for preparing and observing lamellar single crystals from the melts; he and his colleagues used these techniques in the early 1970s to elucidate the polymer crystallization mechanisms of growth, chain folding and melting. He then returned to studies of glasses: In 1975 John M. Hutchinson, John J. Aklonis and Kovacs presented a multiple-ordering-parameter model of structural recovery in polymer glasses based upon the thermodynamics of irreversible processes; with A. R. Ramos they further developed the model, now known as the KAHR model, to incorporate spontaneous structural changes in glasses for any thermal history.

Elias Burstein (University of Pennsylvania) will receive the Frank Isakson Prize for his "pioneering work on the optical properties of semiconductors and insulators, particularly extrinsic photoconductivity, the anomalous

band-edge optical absorption shift (Burstein shift), magneto-optical effects in semiconductors and infrared Raman processes." Burstein received his AB from Brooklyn College in 1938 and his AM in chemistry from Kansas University in 1941. His graduate studies, begun at MIT in 1941, were interrupted by World War II, but continued in 1946-48 at Catholic University. He worked at the US Naval Research Laboratory in 1945-58, first as a member of the physics section of the crystal branch (1945-57) and then as head of the semiconductor branch (1957-58). At NRL Burstein pioneered studies of the optical properties of semiconductors, resulting in his discovery (1954) of the "Burstein shift" of the apparent absorption edge due to band-edge carriers. In addition he began studies of infrared lattice vibration absorption processes and magnetic resonances. In 1958 Burstein became a professor of physics at the University of Pennsylvania,

where he helped establish the Laboratory for Research on the Structure of Matter. There he has continued his studies of the optical properties of solids, in particular the magnetic resonances in semimetal and narrow-band-gap semiconductors and quantum detection of the radiation emitted by superconductors; in the 1960s he pioneered the use of laser Raman scattering in the study of surfaces of insulators and semiconductors. Burstein has been the editor of *Solid State Communications* since 1969, and coeditor of *Comments on Solid State Physics* since 1971. He was named Mary Amanda Wood Professor of Physics at Pennsylvania in 1982.

John J. Croat and Jan F. Herbst (General Motors Corporation), Norman C. Koon (Naval Research Laboratory) and Masato Sagawa (Sumitomo Special Metals Company) will share the International Prize for New Materials for their "pioneering research on the prep-

Symposium of the Divisions of Biological and Chemical Physics: Physics of medical nmr. *S. Koenig, D. Ailion, O. Nalcioglu, T. Brown*

Symposium of the Materials-Physics Topical Group: Nonequilibrium processing of solids. *F. Spaepen, P. S. Peercy, G. L. Olson, W. L. Johnson*

Symposium of the Committee on Applications of Physics: Physics of high speed transistors. *C. O. Bozler, M. Heiblum, M. S. Shur, R. J. Malik, A. Kastalsky*

Chaos in Josephson junctions and instabilities in other systems. *M. Tinkham*

Materials physics: Pattern formation. *Knobler*

Particle-surface interactions. *J. Unguris*

Charge density wave conductors. *E. Jansen*

Superconducting tunneling: Materials and miscellaneous. *T. R. Lemberger*

afternoon

Symposium of the Division of Condensed-Matter Physics: Strained-layer superlattices. *G. C. Osbourn, D. V. Lang, G. Abstreiter, R. M. Martin, R. Fischer*

Symposium of the Division of Condensed-Matter Physics: Magnetism in thin layers. *S. D. Bader, C. L. Fu, J. G. Gay, W. W. Webb, J. Kwo*

Symposium of the Division of Biological Physics: Search for a consistent picture of DNA dynamics. *B. H. Zimm, J. M. Schurr, V. A. Bloomfield, E. W. Prohfsky*

Symposium of the Division of Chemical Physics: NMR studies of surfaces. *C. P. Slichter, T. M. Duncan, B. C. Gerstein, C. R. Dybowski*

Symposium of the Committee on Applications of Physics: Physics of medical x-ray imaging. *Mickish, Jeromin, Schwenker, Gould, Muntz*

Low-dimensional systems theory. *M. Kardar*

Superconductivity: Josephson junction arrays and instruments. *D. Face*

General spectroscopy. *R. E. Watson*

THURSDAY

morning

Symposium of the Division of Condensed-Matter Physics: Kinetics of ordering and phase separation. *G. F. Mazenko, D. Huse*

Symposium of the Division of Condensed-Matter Physics: Two-dimensional and spin-polarized He. *M. Rasolt, J. D. Reppy, C. N. Archie, B. Castaing, M. Chapellier*

Symposium of the Division of Chemical Physics: Advances in electron-spin resonance. *K. Mobius, J. S. Hyde, M. K. Bowman, J. H. Freed*

Symposium of the Division of Electron and Atomic Physics: Physics and clusters. *K. Raghavachari, D. H. Levy, Foster*

Symposium of the Committee on Education: Frontiers in physics education. *J. P. Gollub, S. Tobias, J. Rutherford, F. Reif, R. Resnick*

1/f Noise. *Rogers*

Materials physics: Transport in oxides. *N. Peterson*

Disordered materials: Mainly Si. *D. W. Schaefer*

Electronic transport. *A. F. J. Levi*

Heterostructure inversion layers in high magnetic fields. *G. D. Mahan*

Semiconductors: alloys. *T.-S. Kuan*

Symposium of the Division of Condensed-Matter Physics: Si surface reconstruction. *R. Tromp, K. Takayangi, R. S. Becker*

afternoon

Symposium of the Division of Condensed-Matter Physics: Monolayers on graphite. *M. Chan, O. G. Moruetsen, A. N. Berker*

Symposium of the Division of Condensed-Matter Physics: Heavy fermion superconductors. *D. K. Lambert, D. J. Bishop, R. A. Klemm, Stassis*

Symposium of the Division of Chemical Physics: Magnetic resonance in systems of low dimensionality. *A. J. Heeger, B. H. Robinson, H. Thomann, J. Reimer, D. Davidov*

Symposium of the Division of Electron and Atomic Physics: Charge transfer in ion-surface collisions. *N. Tolk, C. Rau, J. Burdger, K. Snowdon, J. S. Risley*

Symposium of the Division of the History of Physics: History of applied physics. *B. Cimbley, G. Sanford, A. Butrica, M. A. Finocchiaro*

Composites and percolation. *D. Wilkinson*

Materials physics: Synchrotron-radiation studies. *McWhan*

Liquid crystals. *J. A. Zasadzinski*

Novel probes of quantum Hall regime. *J. R. Kirtley*

Electrical properties. *Carr*

Symposium of the Division of Condensed-Matter Physics: Optical properties of semiconductors. *E. Burstein, J. Quinn, A. Pinczuk*

FRIDAY

morning

Symposium of the Division of Condensed-Matter Physics: Core-level spectroscopy. *Eberhardt, F. J. Himpsel*

Symposium of the Division of Condensed-Matter Physics: Exotic and vivacious liquid crystal phases. *S. Gruner, P. Pieranski, H. L. Ong, W. W. Webb, H. R. Brand*

Symposium of the Division of Chemical Physics: Applications of nmr to current problems in physics. *A. J. Berlinsky, R. C. Richardson, J. H. Ross, W. G. Clark*

Statistical physics. *D.-L. Lee*

Metal-insulator transitions. *M. Buttiker*

Symposium of the Division of Condensed-Matter Physics: Superconductivity at the two-dimensional threshold. *D. U. Gubser, A. F. Hebard, J. V. Jose*

afternoon

Symposium of the Division of Condensed-Matter Physics: Localized excitations in solids. *G. Sawatzky, M. Norman, V. Henrich, Carlsson, A. Williams*

Symposium of the Division of Condensed-Matter Physics: Time-resolved optical probes of electron heating. *J. Shah, Fujimoto, J. Tauc, D. Hulin, J. C. Tsang*

Materials physics: Synchrotron-radiation studies. *S. Durbin*

Materials physics: Interfaces. *M. Ruhle*

Theory: Molecular and electronics. *S. Fishman*

aration and characterization of rare earth-iron-boron materials, which led to the discovery of a new class of permanent magnets of unusual scientific interest and technological promise." Croat shared the 1985 AIP Prize for Industrial Applications of Physics with his colleague Robert W. Lee (see PHYSICS TODAY, December, page 72). Herbst received his PhD in physics in 1974 from Cornell University. He worked at NBS (1974-76) and at Brookhaven National Laboratory (1976-77) before joining GM in 1977. Croat and Herbst used a melt-spinning process to create iron-rare earth alloys having very high magnetizations and a low cost, as they were fabricated from materials that are abundant in the US. Koon's research at NRL focused on rare earth-iron-boron mixtures; his results convinced the GM group to retain boron in the alloy's composition—leading Croat and his colleagues to investigate ternary systems. In 1984 Croat and his coworkers reported what is now viewed as the optimum composition, $\text{Nd}_2\text{Fe}_{14}\text{B}$; that same year Herbst and his colleagues deduced the system's crystal and magnetic structure. Simultaneously Sagawa and his group developed a nearly identical neodymium-iron-boron compound using conventional powder-metallurgy techniques. Croat is now assistant engineering manager of magnetic products in the Delco-Remy division of General Motors; Herbst has been a research physicist in the solid-state-physics division since 1980.

John K. Galt (The Aerospace Corporation) will receive the George E. Pake Prize for his "application of cyclotron resonance techniques to studies of Fermi surfaces of metals and domain-wall motion in ferrites and for his imaginative management of science, which has led to new solid-state technologies including light-emitting diodes, semiconductor lasers, molecular-beam epitaxy and superconducting electronics." Galt received his AB from Reed College in 1941 and his PhD from MIT in 1947. After a year as an NRC fellow at the University of Bristol, England, Galt joined the Physical Research Lab of Bell Laboratories in 1948. His initial studies there of domain-wall motion in ferrites found application in work on hysteresis losses. He later pioneered the use of cyclotron resonance in metals and semimetals to determine the Fermi surfaces of materials such as bismuth and its alloys. Galt was head of the solid-state- and plasma-physics research department of the Physical Research Lab for 1957-61. As director of the solid-state-electronics research lab in Bell Labs' physics division (1962-74), he initiated research programs in new solid-state-based technologies such as the semiconductor injection laser,

new crystal-growth techniques and semiconductor luminescence. In 1974 he became director of solid-state sciences at Sandia National Laboratories, where he encouraged new surface-physics research programs. In 1978 Galt became Sandia's vice-president of research. He joined the Aerospace Corporation this year.

James K. G. Watson (Herzberg Institute of Astrophysics, National Research Council of Canada) will receive the Earle K. Plyler Prize for his "numerous fundamental contributions to the theory of rovibronic [rotational-vibrational] interactions in molecules, especially the development of the universally used 'Watson Hamiltonian' for vibration-rotation energy levels, the unified treatment of centrifugal distortion in molecules, the elucidation of forbidden rotational transitions in spherical tops, the application of advanced symmetry arguments to perturbations in external fields and investigations of the Jahn-Teller effect in H_3 and NH_4 ." In the latter part of the 1960s, Watson used contact transformations to recast the effective rotational Hamiltonian operator in an improved form, which now bears his name. The series of papers in which he reported this work significantly clarified the general problem of determinable parameters, and Watson's technique was soon applied by other workers to spin-rotation problems and vibration-rotation problems in spherical top molecules. In addition, Watson greatly simplified the Wilson-Howard vibration-rotation Hamiltonian, using commutator relations and sum rules to show that a group of higher-order terms—usually ignored in calculations because of their complexity—could be cast in a much more compact and useful form. In the early 1970s Watson demonstrated that molecules having no permanent dipole moment could still exhibit pure rotational electric-dipole spectra via rotationally induced electric-dipole moments. He has recently elucidated the spectra of H_3 and NH_4 .

Murugappan Muthukumar (University of Massachusetts, Amherst) will receive the John H. Dillon Medal for "advancing the predictive power of equilibrium and dynamical theory of polymer solutions." Muthukumar received his BSc (1970) and his MS (1972) from the University of Madras, India, and his PhD in chemistry (1979) from the University of Chicago. From 1979 to 1981 he was a postdoctoral fellow at Cambridge, where he and Sir Sam Edwards developed a comprehensive theory of the equilibrium and dynamics of amorphous polymers in solution over a wide range of concentrations. In 1981 he became an assistant professor of chemistry at the Illinois Institute of Technology. In 1983 he became an

associate professor at the University of Massachusetts, Amherst, in the polymer-science and engineering department. Most recently he has worked on the concentration dependence of polymer relaxation times, the dynamics of polymeric fractals and the excluded volume of a single polymer chain.

Jerry Gollub (Haverford College) has been selected as the first recipient of the Award for Research in an Undergraduate Institution for his "outstanding research in nonlinear dynamics, fluid turbulence and the formation of patterns in nonequilibrium systems, and for his energetic guidance of Haverford College undergraduate students who have fully participated in the research." The award was established last year with funding from the Research Corporation; it is unique among APS prizes in that it goes to a faculty member at an undergraduate institution whose research involves students (see PHYSICS TODAY, August, page 75). Gollub received his BA from Oberlin College in 1966, his MA from Harvard University in 1967 and his PhD from Harvard in 1971. He has taught at Haverford, where he is currently department chairman and professor of physics, since 1970. In addition, he is an adjunct professor at the University of Pennsylvania. He served as a member of the condensed-matter-physics panel of the NRC physics survey committee in 1983-84; he is now the secretary-treasurer of the APS Division of Fluid Dynamics. Gollub demonstrated the connection between fluid turbulence and deterministic models of chaotic phenomena by isolating various routes to chaos. He showed that strange attractors can arise in fluid systems through nonlinear interactions among several distinct hydrodynamic modes. He and his students have studied the process of pattern formation and evolution in the convection of fluids using both lasers and Doppler and digital imaging methods. His current work on nonlinear pattern formation includes studies of morphological instabilities at solid-liquid interfaces.

Physics show, special services

Viewing hours for this year's physics show, which features 62 companies, will be Tuesday, 1 April, from noon to 6 pm; Wednesday from 10 am to 5 pm; and Thursday from 10 am to 3 pm. Sited in the Goldwyn Pavillion, the exhibit will feature research instrumentation and materials, as well as scientific books and journals.

The American Physical Society will again sponsor a placement center at the March meeting; its hours will be Monday through Wednesday, 9 am to 5 pm, and Thursday, 9 am to noon.

MARGARET MARYNOWSKI □