PUBLICATIONS

Compilation of principal recently published books and technical articles written by APL staff members.

J. R. Kuttler and V. G. Sigillito, "Inequalities for Membrane and Stekloff Eigenvalues," *J. Math. Anal. and Appl.* **23**, July 1968, 148–160.

W. G. Spohn, "Blichfeldt's Theorem and Simultaneous Diophantine Approximation," *American J. Math.* **XC**, No. 3, July 1968, 885-894.

L. Monchick and S. I. Sandler (Univ. of Delaware) and E. A. Mason (Brown Univ.), "Thermal Diffusion in Polyatomic Gases: Nonspherical Interactions," *J. Chem. Phys.* **49**, No. 3, Aug. 1, 1968, 1178-1184.

E. V. Byron and J. Frank, "On the Correlation between Wideband Arrays and Array Simulators," *IEEE Trans. Antennas and Propagation* **AP-16**, No. 5, Sept. 1968, 601-603.

S. J. Wyard and R. C. Smith (Guy's Hospital Medical School, London) and F. J. Adrian, "ESR Spectrum of HO_2 in Solutions of Hydrogen Peroxide in Water at 77° K," *J. Chem. Phys.* **49**, No. 6, Sept. 15, 1968, 2780–2783.

N. Filipescu (Geo. Wash. Univ.), K. Moorjani (APL), N. McAvoy, S. Bjorklund, C. R. Hurt, and J. Zumoff (NASA/Goddard Space Flight Center), "Fluorescence Spectra of Homogeneous and Mixed Europium Complexes," *Appl. Spectroscopy* **22**, Sept.–Oct. 1968, 513-519.

S. N. Foner and R. L. Hudson, "Mass Spectrometry of Very Fast Reactions: Identification of Free Radicals and Unstable Molecules Formed in Atom-Molecule Reactions," *J. Chem. Phys.* **49**, No. 8, Oct. 15, 1968, 3724–3725.

J. C. Murphy and J. Bohandy, "Electric Effect in Ruby," *J. Chem. Phys.* **49**, No. 8, Oct. 15, 1968, 3733–3734.

J. C. Pirkle, "Perturbed Morse-Oscillator Approximation in Reactive Collisions. I. Attractive Potential," *J. Chem. Phys.* **49**, No. 8, Oct. 15, 1968, 3532-3540.

R. B. Kershner, "On Paving the Plane," *American Math. Monthly* **75**, No. 8, Oct. 1968, 839-844.

R. A. Kropfli, I. Katz, T. G. Konrad, and E. B. Dobson, "Simultaneous Radar Reflectivity Measurements and Refractive Index Spectra in the Clear Atmosphere," *Radio Science* **3** (New Series), No. 10, Oct. 1968, 991-994.

J. A. Schetz, "Turbulent Mixing of a Jet in a Coflowing Stream," *AIAA Journal* **6**, No. 10, Oct. 1968, 2008-2010.

T. C. Cheston, "Phased Arrays for Radars," *IEEE Spectrum*, Nov. 1968, 102-111.

B. F. Hochheimer and R. E. Walker, "Background Suppression in Fourier Emission Spectroscopy of a Thermally Excited Gas," *J. Opt. Soc. Am.* **58**, No. 11, Nov. 1968, 1542–1543.

V. O'Brien, "Form Factors for Deformed Spheroids in Stokes Flow," *AIChE Journal* **14**, No. 6, Nov. 1968, 870-875.

J. C. Pirkle and H. A. McGee, Jr. (Georgia Inst. Tech.), "Perturbed Morse-Oscillator Approximation in Reactive Collisions. II. A Repulsive Potential," *J. Chem. Phys.* **49**, No. 10, Nov. 15, 1968, 4504-4508.

R. Turner and T. O. Poehler, "Far-Infrared Laser Interferometry for Electron Density Measurements," *J. Appl. Phys.* **39**, No. 12, Nov. 1968, 5726–5731.

C. O. Bostrom, "Solar Protons Observed at 1100 km during March 1966," *Ann. Geophys.* **24**, No. 3, 1968, 841-845.

ADDRESSES

Principal recent addresses made by APL staff members to groups and organizations outside the Laboratory.

R. A. Farrell (APL) and P. H. E. Meijer (Catholic University), "Study of the Critical Behavior of the Specific Heat for the Ising Model," *International Conference on Statistical Mechanics, University of Tokyo, Institute of Physics*, Tokyo, Japan, September 1968.

M.H. Friedman, "A General Thermal Explosion Criterion. Application to Initiation of Imbedded Wires," *Western States Combustion Institute, Stanford Research Institute*, Menlo Park, Calif., Oct. 28, 1968.

I. Katz, "Fine Scale Atmospheric Structure Seen by Radar," *Seminar, Department of Meteorology, Massachusetts Institute of Technology*, Cambridge, Mass., Oct. 28, 1968.

J. B. Garrison, D. G. Grant, and R. J. Johns, "A System for Producing Three Dimension X-Ray Images," *Conference on Engineering in Medicine and Biology*, Houston, Texas, November 21, 1968.

L. C. Aamodt, J. C. Murphy, A. H. Piksis, and C. K. Jen, "Dynamics of B-Absorption and R_1-Emission in Ruby by Optical Detection of Ground-State ESR," *American Physical Society*, Miami Beach, Florida, November 25-27, 1968.

C. Feldman, "The Prospects for Electron Devices from Non-Crystalline Semiconductors," *IEEE Professional Group on Electron Devices*, Washington, D. C., December 2, 1968.

D. L. Mackison and P. M. Bainum, "Magnetic Sample-and-Hold Damping of a Gravity-Gradient Stabilized Satellite," *Gravity-Gradient Symposium, Aerospace Corporation*, Los Angeles, California, December 3-5, 1968.

R. M. Fristrom, "Molecular Beams and Chemical Problems," *Chemical Colloquium, University of Toronto*, Toronto, Canada, December 6, 1968.

A. A. Westenberg, "The Absolute Measurement of the O plus C_2H_2 Rate Coefficient," *American Chemical Society, Southwest Regional Meeting*, Austin, Texas, December 6, 1968.

Mary M. Schaefer, "Current Research in Technical Communications in the United States," *First International Symposium, Society of Technical Writers and Publishers*, Tel Aviv, Israel, December 9-12, 1968.

APL COLLOQUIA

Nov. 1—"The Rebirth of the Infinitesimal," by A. Robinson, Yale University.

Nov. 8—"The Mechanisms of Earthquakes," by L.M. Murphy, Environmental Science Services Administration.

Nov. 15—"Origin of the Moon and Geophysical Consequences," by S.F. Singer, Department of the Interior.

Nov. 22—"Civil Disorders and the Politics of Discontent," by P.H. Rossi, The Johns Hopkins University.

Dec. 6—"Science and Politics 1969; The Road Bends Sharply," by P. Abelson (Carnegie Institution).

Dec. 13—"A Technique for a Three-Dimensional X-Ray Display," by J. B. Garrison and D. G. Grant (APL), "Theory of the Structure of the Cornea," by R. W. Hart (APL), and "An Artificial Blood Pump that Controls Pulse Shape," by W. Seamone (APL).

PATENTS

C. J. Swet and R. G. Bartlett, Jr.—*Method of and Apparatus for Atmosphere Replenishment and Control,* Patent No. 3,403,612.

A. J. Bell, R. W. Blevins, H. J. Everett, W. Garten, Jr., and E. J. Hardgrave, Jr.—*Guided Missile,* Patent No. 3,403,873.

D. D. Scott and W. J. Roemer—*Attaching and Sealing Means for Flash Goggle Lenses,* Patent No. 3,409,909

D. W. Rabenhorst—*Mobile Space Suit Joints,* Patent No. 3,411,157.

D. K. Anand—*Heat Pipe Control Apparatus,* Patent No. 3,414,050.

A. M. Chwastyk—*Optical Phase Shifter,* Patent No. 3,415,593.

S. D. Raezer—*Arc Apparatus Employing Three-Dimensional Arc Motion and Dynamic Balancing,* Patent No. 3,416,021.

W. E. Ray—*Phase Comparator Utilizing Logic Circuitry Feed,* Patent No. 3,416,083.

APPOINTMENT

L. L. Cronvich, Supervisor of the Aerodynamics Group, has accepted an appointment for the third year as a member of the AIAA Technical Committee on Atmospheric Flight Mechanics.

WITH THE AUTHORS

Frederick S. Billig, co-author of "External Burning in Supersonic Streams," is a native of Pittsburgh, Pennsylvania. He received a B.E. degree in mechanical engineering from The Johns Hopkins University, and M.S. and Ph.D. degrees, in 1957 and 1964, from The University of Maryland. Dr. Billig joined APL in 1955, prior to which he was an engineering assistant at The Johns Hopkins Institute for Cooperative Research. He is currently a lecturer in aerospace engineering and is a member of the graduate faculty of The University of Maryland. Dr. Billig is Supervisor of the Ramjets Project of the Hypersonic Propulsion Group, directing the supersonic combustion program on hydrogen and storable liquid fuels, and experimental programs on and analysis of hypersonic airbreathing propulsion systems. He is the 1966 recipient of the Distinguished Young Scientist Award by the Maryland Academy of Sciences. Dr. Billig is a member of the Combustion Institute, American Institute of Aeronautics and Astronautics, the Maryland Academy of Sciences, and has served on the Technical Committee on Airbreathing Propulsion of the AIAA.

Gordon L. Dugger, co-author of "External Burning in Supersonic Streams," was born in Winter Haven, Florida. He received B.Ch.E. and M.S.E. degrees from the University of Florida and, in 1953, a Ph.D. degree in chemical engineering from the Case Institute of Technology. Prior to joining the staff of APL in 1957, Dr. Dugger was an instructor at the University of Florida, Aeronautical Research Scientist at the NACA Lewis Laboratory, and supervisor of chemical process development at International Minerals and Chemical Corporation. He came to APL as a specialist in combustion research. He is presently Supervisor of the Hypersonic Propulsion Group, directing analyses and experimental research and development programs on advanced airbreathing propulsion systems. Dr. Dugger is a member of the Combustion Institute and the American Institute of Aeronautics and Astronautics, and he has served as a member of the Airbreathing Propulsion Committee of the AIAA and as Chairman of the ARS Ramjets Committee. He has been Editor-in-Chief of the AIAA's *Journal of Spacecraft and Rockets* since its inception in 1964. In 1964 he received the Award in Engineering Sciences from the Washington Academy of Sciences.

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