

Recent Papers by IBM Authors

Reprints of the papers listed here may usually be obtained by writing directly to the authors. The authors' IBM divisions are identified as follows: DPD is the Data Processing Division; FED, Field Engineering Division; FSD, Federal Systems Division; GPD, General Products Division; GSD, General Systems Division; OPD, Office Products Division; RES, Research Division; SCD, System Communications Division; and SPD, System Products Division.

- Papers are listed alphabetically by name of journal.

A

ATS-6 Interferometer: A Precision, Wide-Field-of-View Attitude Sensor, M. A. Teichman, F. L. Marek, J. J. Browning, and A. K. Parr (FSD Manassas, VA), *American Institute of Aeronautics and Astronautics, Communications Satellite Developments: Technology in Aeronautics and Aeronautics* **42**, 35-47 (1976).

Reflective Multilayer Coatings for the Far uv Region, E. Spiller (RES Yorktown Hts., NY), *Applied Optics* **15**, No. 10, 2333-2338 (October 1976).

Shock Wave Introduction of Gas into Relativistic e-Beam-Pumped Lasers and Drift Tubes, R. W. Dreyfus (RES Yorktown Hts., NY), *Applied Physics Letters* **29**, No. 6, 348-350 (September 15, 1976).

Organic Solar Cells of Hydroxy Squarylium, V. Y. Merritt and H. J. Hovel (RES Yorktown Hts., NY), *Applied Physics Letters* **29**, No. 7, 414-415 (October 1, 1976).

Applicability of the Fano Plot to Secondary Electron (SE) Yield Data, M. Parikh (RES Yorktown Hts., NY) and R. Shimizu (Osaka University, Japan), *Applied Physics Letters* **29**, No. 8, 516-517 (October 15, 1976).

Electron-beam Fabrication of 80-Å Metal Structures, A. N. Broers, W. W. Molzen, J. J. Cuomo, and N. D. Wittels (RES Yorktown Hts., NY), *Applied Physics Letters* **29**, No. 9, 596-598 (November 1, 1976).

Observation and Analysis of Very Rapid Optical Degradation of GaAs/GaAlAs DH Laser Material, B. Monemar (The Lund Institute of Technology, Sweden) and G. R. Woolhouse (RES Yorktown Hts., NY), *Applied Physics Letters* **29**, No. 9, 605-607 (November 1, 1976).

Hole Conduction in Si₃N₄ Films on Si, Z. A. Weinberg (RES Yorktown Hts., NY), *Applied Physics Letters* **29**, No. 9, 617-619 (November 1, 1976).

B

Protein Rotational Relaxation as Studied by Solvent ¹H and ²H Magnetic Relaxation, K. Hallenga (Vrije Universiteit Brussels, Belgium) and S. H. Koenig (RES Yorktown Hts., NY), *Biochemistry* **15**, No. 19, 4255-4264 (September 21, 1976).

Magnetic Studies of Chromatium Flavocytochrome C₅₅₂: A Mechanism for Heme-Flavin Interaction, T. C. Streckas (RES Yorktown Hts., NY), *Biochimica et Biophysica Acta (P)* **446**, No. 1, 179-191 (September 28, 1976).

Numerical Integration of a Stochastic Model for the Volterra-Lotka Reaction, J. Walker (Mills College, Oakland, CA), A. Van Nypelseer (Université Libre de Bruxelles, Belgium), and W. E. Langlois (RES San Jose, CA), *Bulletin of Mathematical Biology* **38**, No. 5, 535-546 (1976).

C

Fluorescence and Decomposition of 1,4-Diazabicyclo [2.2.2]-Octane in a Glow Discharge, F. Lahmani and R. Srinivasan (RES Yorktown Hts., NY), *Chemical Physics Letters* **42**, No. 1, 111-114 (August 15, 1976).

Entropy Production in a Reactive Collision, R. K. Nesbet (RES San Jose, CA), *Chemical Physics Letters* **42**, No. 2, 197-201 (September 1, 1976).

Determination of the Structure of Successively Deposited Ordered Layers of Cd on Ti(0001) by Low-Energy Electron Diffraction, H. D. Shih, F. Jona (University of New York, Stony Brook), D. W. Jepsen, and P. M. Marcus (RES Yorktown Hts., NY), *Communications on Physics* **1**, No. 1, 25-31 (January 1976).

Dipolar Behavior in KTa_{0.9}Nb_{0.10}, R. Kind (Laboratory of Solid State Physics, Zurich, Switzerland) and K. A. Müller (RES Zurich, Switzerland), *Communications on Physics* **1**, No. 7, 223-228 (October 1976).

Computing Power to the People—A Conservative Ten-Year Projection, T. C. Chen (RES San Jose, CA), *Creative Computing* **2**, No. 2, 35-38 (March-April 1976).

F

Markowitz Revisited, H. M. Markowitz (RES Yorktown Hts., NY), *Financial Analysts Journal* **32**, No. 5, 47-52 (September/October 1976).

G

Stress Corrosion Resistance Compared with Thermal Expansion and Chemical Durability of Glasses, R. R. Tummala (SPD East Fishkill, NY), *Glass Technology* **17**, No. 4, 145-146 (August 1976).

I

A User-oriented Data-base Retrieval System, A. U. Jones (SPD Endicott, NY), *IBM Systems Journal* **16**, No. 1, 4-17 (1977).

An APL Interpreter and System for a Small Computer, M. Alfonseca, M. L. Tavera, and R. Casajuana (IBM Spain, Scientific Center, Madrid), *IBM Systems Journal* **16**, No. 1, 18-40 (1977).

The IBM 5100 and the Research Device Coupler—A Personal Laboratory Automation System, H. Cole and A. A. Guido (RES Yorktown Hts., NY), *IBM Systems Journal* **16**, No. 1, 41-53 (1977).

A Method of Programming Measurement and Estimation, C. E. Walston and C. P. Felix (FSD Gaithersburg, MD), *IBM Systems Journal* 16, No. 1, 54-73 (1977).

Extended Area Range Instrumentation System Utilizing DME Links, M. J. Marple, W. H. Land, Jr., and R. D. Lavin (FSD Owego, NY), *IEEE Transactions on Aerospace and Electronics AES-12*, No. 5, 590-599 (September 1976).

Recoverability of Communication Protocols—Implications of a Theoretical Study, P. M. Merlin (RES Yorktown Hts., NY) and D. J. Farber (University of California, Irvine), *IEEE Transactions on Communications COM-24*, No. 9, 1036-1043 (September 1976).

Distributed Processing within an Integrated Circuit/Package Switching Node, C. J. Jenny and K. Kümmerle (RES Zurich, Switzerland), *IEEE Transactions on Communications COM-24*, No. 10, 1089-1100 (October 1976).

Active DC Directional Couplers, P. Stuckert (RES Yorktown Hts., NY), *IEEE Transactions on Instrumentation and Measurement IM-25*, No. 3, 241-244 (September 1976).

Electrical Characteristics of a Two-Level Single Ground-Plane Interconnection in Josephson Tunneling Logic, Y. L. Yao (RES Yorktown Hts., NY), *IEEE Transactions on Parts, Hybrids, and Packaging PHP-12*, No. 3, 236-240 (September 1976).

Scheduling of Unit-length Independent Tasks with Execution Constraints, T. Lang (University of California, Los Angeles) and E. B. Fernández (IBM Scientific Center, Los Angeles, CA), *Information Processing Letters* 4, No. 4, 95-98 (January 1976).

J

The Stability of a Spinning Elastic Disk with a Transverse Load System, D. Iwan and T. L. Moeller (RES Yorktown Hts., NY), *Journal de Mécanique et de Physique de l'Atmosphère* 43, No. 3, 485-490 (1976).

Capacitance and Ellipsometrically Determined Oxide Thickness of Nb-oxide-Pb Josephson Tunneling Junctions, S. Basavaiah and J. H. Greiner (RES Yorktown Hts., NY), *Journal of Applied Physics* 47, No. 9, 4201-4202 (September 1976).

Determination of Insulator Bulk Trapped Charge Densities and Centroids from Photocurrent-Voltage Characteristics of MOS Structures, D. J. DiMaria (RES Yorktown Hts., NY), *Journal of Applied Physics* 47, No. 9, 4073-4077 (September 1976).

Dislocation Propagation and Emitter Edge Defects in Silicon Wafer, S. M. Hu, S. Klepner, R. O. Schwenker, and D. K. Seto (SPD East Fishkill, NY), *Journal of Applied Physics* 49, No. 9, 4098-4108 (September 1976).

Detection and Origins of Crystal Defects in GaAs/GaAlAs LPE Layer, G. R. Woolhouse, A. E. Blakeslee, and K. K. Shih (RES Yorktown Hts., NY), *Journal of Applied Physics* 47, No. 10, 4349-4352 (October 1976).

Current Runaway in Insulators Affected by Impact Ionization and Recombination, N. Klein (Israel Institute of Technology, Haifa) and P. Solomon (RES Yorktown Hts., NY), *Journal of Applied Physics* 47, No. 10, 4364-4372 (October 1976).

Surface Enrichment of Copper Due to keV Xe Sputtering of an Al-Cu Mixture, W. K. Chu, J. K. Howard, and R. F. Lever (SPD East Fishkill, NY), *Journal of Applied Physics* 47, No. 10, 4500-4503 (October 1976).

Magnetization and Magnetic Anisotropy in Evaporated GdCo Amorphous Films, R. C. Taylor and A. Gangulee (RES Yorktown Hts., NY), *Journal of Applied Physics* 47, No. 10, 4666-4668 (October 1976).

Simple Analysis of Torque Measurement of Magnetic Thin Films, H. Miyajima, K. Sato (Gahushuin University, Tokyo, Japan), and T. Mizoguchi (RES Yorktown Hts., NY), *Journal of Applied Physics* 47, No. 10, 4669-4671 (October 1976).

An Upper Bound for the Probability of a Union, D. Hunter (RES San Jose, CA), *Journal of Applied Probability* 13, No. 3, 597-603 (September 1976).

Direct Evidence for Manganese (III) Binding to the Manganoperoxidase of *Escherichia coli* B, J. A. Fee (University of Michigan, Ann Arbor), E. R. Shapiro, and T. H. Moss (RES Yorktown Hts., NY), *Journal of Biological Chemistry* 251, No. 19, 6157-6159 (October 10, 1976).

Determination of the Near-Surface Elemental Composition of Catalysts by the Technique of Proton-Induced X-ray Analysis, J. A. Cairns, A. Lurio, J. F. Ziegler (RES Yorktown Hts., NY), D. F. Holloway, and J. Cookson (AERE Harwell, Didcot, England), *Journal of Catalysis* 45, No. 1, 6-14 (1976).

Coupled-Channel Study of Rotational Excitation of a Rigid Asymmetric Top by Atom Impact: (H_2CO , He) at Interstellar Temperatures, B. J. Garrison (University of California, Berkeley), W. A. Lester, Jr. (RES San Jose, CA), and W. H. Miller (University of California, Berkeley), *Journal of Chemical Physics* 65, No. 6, 2193-2200 (September 15, 1976).

Silicon Oxidation Studies: Analysis of SiO_2 Film Growth Data, E. A. Irene and Y. J. Van der Meulen (RES Yorktown Hts., NY), *Journal of the Electrochemical Society* 123, No. 9, 1380-1384 (September 1976).

New Flash Evaporation Method Improves Film Preparation, N. S. Platakis (RES San Jose, CA) and H. C. Gatos (Massachusetts Institute of Technology, Cambridge, MA), *Journal of the Electrochemical Society* 123, No. 9, 1409-1410 (September 1976).

A New Paint-on Diffusion Source, K. D. Beyer (SPD East Fishkill, NY), *Journal of the Electrochemical Society* 123, No. 10, 1556-1560 (October 1976).

Silicon Monoxide Thin Films, S. I. Raider (RES Yorktown Hts., NY) and R. Flitsch (SPD East Fishkill, NY), *Journal of the Electrochemical Society* 123, No. 11, 1754-1757 (November 1976).

An Internal Calibration Technique for Pseudobinary Systems by Auger Electron Spectroscopy, R. Hammer, N. J. Chou, and J. M. Eldridge (RES Yorktown Hts., NY), *Journal of Electronic Material* 5, No. 6, 557-584 (December 1976).

DNA Synthesis *In vivo* in *Bacillus Subtilis*, J. J. Anderson (RES San Jose, CA) and A. T. Ganesan (Stanford School of Medicine, CA), *Journal of Molecular Biology* 106, No. 2, 285-295 (September 15, 1976).

Rotating-Compensator/Analyzer Fixed-Analyzer Ellipsometer: Analysis and Comparison to Other Automatic Ellipsometers, D. E. Aspnes (Bell Laboratories, Murray Hill, NJ) and P. S. Hauge (RES Yorktown Hts., NY), *Journal of the Optical Society of America* 66, No. 9, 949-954 (September 1976).

The Role of Noise in Negative Resistance Circuits, R. Landauer (RES Yorktown Hts., NY), *Journal of the Physical Society of Japan* 41, No. 2, 695-696 (August 1976).

Electro-Optical Effect, Acoustic Resonance and Space Charge in KTaO_3 , U. T. Höchli (RES Zurich, Switzerland), *Journal of Physics C* 9, No. 18, L495-L499 (September 8, 1976).

Dry Process Technology (Reactive Ion Etching), J. A. Bondur (SPD East Fishkill, NY), *Journal of Vacuum Science and Technology* 13, No. 5, 1023-1029 (September/October 1976).

Sputtering in the Surface Analysis of Solids: A Discussion of Some Problems, J. W. Coburn (RES San Jose, CA), *Journal of Vacuum Science and Technology* 13, No. 5, 1037-1044 (September/October 1976).

P

The Structure and the Carbohydrate Binding of the Lectin Concanavalin A, K. D. Hardman (RES Yorktown Hts., NY), *PAABS Revista* 5, No. 1, 79-97 (1976).

Oxygen Precipitation and the Generation of Dislocations in Silicon, T. Y. Tan and W. K. Tice (SPD Burlington, VT), *Philosophical Magazine* 34, No. 4, 615-631 (October 1976).

Stieltjes Imaging Method for Computation of Oscillator-Strength Distributions for Complex Atoms, R. K. Nesbet (RES San Jose, CA), *Physical Review A* 14, No. 3, 1065-1081 (September 1976).

He^- Resonances and the Post-Collision Interaction, R. K. Nesbet (RES San Jose, CA), *Physical Review A* 14, No. 4, 1326-1332 (October 1976).

Quantitative Tunneling Spectroscopy Study of Molecular Structural Changes due to Electron Irradiation, M. Parikh (RES Yorktown Hts., NY), J. T. Hall, and P. K. Hansma (University of California, Santa Barbara), *Physical Review A* 14, No. 4, 1437-1446 (October 1976).

Raman Scattering Study and Symmetry Aspects of the Phase Transition in Ferroelastic Sb_2O_3 , W. Prettl (University of Regensburg, Germany) and K. H. Rieder (RES Zurich, Switzerland), *Physical Review B* 14, No. 5, 2171-2179 (September 1, 1976).

Photochromism in Ni-Doped SrTiO_3 , P. Koidl, K. W. Blazey, W. Berlinger, and K. A. Müller (RES Zurich, Switzerland), *Physical Review B* 14, No. 7, 2703-2708 (October 8, 1976).

Transformation from Raman Scattering to Photoluminescence at the C Exciton of CdSe, P. Y. Yu and J. E. Smith, Jr. (RES Yorktown Hts., NY), *Physical Review Letters* 37, No. 10, 622-625 (September 6, 1976).

Optical Free-Induction Decay in $\text{LaF}_3:\text{Pr}^{3+}$, A. Z. Genack, R. M. Macfarlane, and R. G. Brewer (RES San Jose, CA), *Physical Review Letters* 37, No. 16, 1078-1080 (October 18, 1976).

Dynamic Polarization Echoes in Powders, K. Kajimura (Tanashi, Tokyo, Japan), K. Fossheim (The Norwegian Institute of Technology, Trondheim, Norway), T. G. Kazyaka, R. L. Melcher, and N. S. Shiren (RES Yorktown Hts., NY), *Physical Review Letters* 37, No. 17, 1151-1155 (October 25, 1976).

New Coherent Averaging Effect in Magnetic Resonance: Modulation-Induced Reduction of Dipolar Coupling, C. S. Yannoni and H. Vieth (RES Yorktown Hts., NY), *Physical Review Letters* 37, No. 18, 1230-1232 (November 1, 1976).

Is the Central Peak in Three-Dimensional Lattices Barely Resolvable Owing to Topological Reasons?, E. Stoll (RES Zurich, Switzerland), *Physics Letters* 58A, No. 2, 121-122 (August 9, 1976).

Raman Measurements of the Superionic Conductor KAgI_2 , G. Burns, F. H. Dacol, and M. W. Shafer (RES Yorktown Hts., NY), *Physics Letters* 58A, No. 4, 229-230 (September 6, 1976).

R

Thermal Drive Apparatus for Direct Vacuum Tunneling Experiments, W. A. Thompson and S. F. Hanrahan (RES Yorktown Hts., NY), *Review of Scientific Instruments* 47, No. 10, 1303-1304 (October 1976).

A Note on Some Lebesgue Constants, E. W. Cheney (University of Texas, Austin) and T. J. Rivlin (RES Yorktown Hts., NY), *Rocky Mountain Journal of Mathematics* 6, No. 3, 435-439 (Summer 1976).

S

Inhibition by Anions of Human Red Cell Carbonic Anhydrase B: Physiological and Biochemical Implications, S. H. Koenig and R. D. Brown, III (RES Yorktown Hts., NY), *Science* 194, No. 4266, 745-746 (November 12, 1976).

Generalized Program Schemas, A. K. Chandra (RES Yorktown Hts., NY), *SIAM Journal on Computing* 5, No. 3, 402-413 (September 1976).

Dynamic High-Temperature X-Ray Diffraction, G. A. Walker, C. C. Goldsmith, and S. Lawhorne (SPD East Fishkill, NY), *Siemens Review, 8th Special Issue* 18, 38-40 (1976).

Analysis of Energy Level Shifts in the Photoemission Spectra of Absorbed Molecules: CO on Ni, P. S. Bagus and K. Hermann (RES San Jose, CA), *Solid State Communications* 20, No. 1, 5-8 (October 1976).

Weak-Ferromagnetism of Quasi Two-Dimensional Manganese Stearate, M. Pomerantz and A. Aviram (RES Yorktown Hts., NY), *Solid State Communications* **20**, No. 1, 9-11 (October 1976).

A Limitation on the Pseudopotential Method, J. F. Janak (RES Yorktown Hts., NY), *Solid State Communications* **20**, No. 2, 151-153 (October 1976).

Photon Assisted Tunneling from Aluminum into Silicon Dioxide, Z. A. Winberg and A. Hartstein (RES Yorktown Hts., NY), *Solid State Communications* **20**, No. 3, 179-182 (October 1976).

Symmetry of the Top of the Valence Band in MoS_2 , F. Mehran, R. S. Title, and M. W. Shafer (RES Yorktown Hts., NY), *Solid State Communications* **20**, No. 4, 369-371 (October 1976).

Electron Paramagnetic Detection of Ionic Motational Effects in the Superionic Conductor β -Sodium Gallate, R. S. Title and G. V. Chandrashekar (RES Yorktown Hts., NY), *Solid State Communications* **20**, No. 4, 405-408 (October 1976).

On the Absorption of Infrared Radiation by Electrons in Semiconductor Inversion Layers, S. J. Allen, Jr., D. C. Tsui (Bell Laboratories, Murray Hill, NJ), and B. Vinter (RES Yorktown Hts., NY), *Solid State Communications* **20**, No. 4, 425-428 (October 1976).

High Transmission X-Ray Masks for Lithographic Applications, E. Bassous, R. Feder, E. Spiller, and J. Topalian (RES Yorktown Hts., NY), *Solid State Technology* **19**, No. 9, 55-58 (September 1976).

Many-Body Effects in the First Excited Subband of the n-Inversion Layer of Si, B. Vinter and F. Stern (RES Yorktown Hts., NY), *Surface Science* **58**, No. 1, 141-145 (August 1, 1976).

Screening and Level Broadening in Inversion Layers with Random Fixed Charges, F. Stern (RES Yorktown Hts., NY), *Surface Science* **58**, No. 1, 162-168 (August 1, 1976).

Electron Scattering in Silicon Inversion Layers by Oxide and Surface Roughness, A. Hartstein, T. H. Ning, and A. B. Fowler (RES Yorktown Hts., NY), *Surface Science* **58**, No. 1, 178-181 (August 1, 1976).

Some Dynamical Properties of a Two-Dimensional Wigner Crystal, L. Bonsall (RES Yorktown Hts., NY) and A. A. Maradudin (University of California, Irvine), *Surface Science* **58**, No. 1, 312-319 (August 1, 1976).

Recent Progress in Electronic Properties of Quasi-Two-Dimensional Systems, F. Stern (RES Yorktown Hts., NY), *Surface Science* **58**, No. 1, 333-340 (August 1, 1976).

T

Information-Theoretic Characterizations of Recursive Infinite Strings, G. J. Chaitin (RES Yorktown Hts., NY), *Theoretical Computer Science* **2**, No. 1, 45-48 (June 1976).

Correctness of Parallel Programs: The Church-Rosser Approach, B. K. Rosen (RES Yorktown Hts., NY), *Theoretical Computer Science* **2**, No. 2, 183-207 (1976).

Semiconductor Superfine Structures by Computer-Controlled Molecular Beam Epitaxy, L. Esaki and L. L. Chang (RES Yorktown Hts., NY), *Thin Solid Films* **36**, No. 2, 285-298 (1976).

Z

Kristallzüchtung von Strontiumtitanat SrTiO_3 (Crystal Growth of Strontium Titanate SrTiO_3), H. J. Scheel (RES Zurich, Switzerland), *Zeitschrift für Kristallographie* **143**, 417-428 (1976).

Semiconductor Devices: A Bibliography of Fabrication Technology, Properties, and Applications, A. H. Agajanian (SPD East Fishkill, NY), Plenum Publishing Co., New York, 1976, 944 pp.

A compilation is made of over 14000 literature references on the theory, preparation, properties, characterization, modeling, packaging, instrumentation, and applications of semiconducting devices. The period 1967 to 1975 is covered, and selected references are included also prior to 1967. A comprehensive subject index is provided for the journal papers and books listed.

Software Reliability: Principles and Practices, G. J. Myers (IBM Systems Research Institute, New York, NY), John Wiley & Sons, Inc., New York, 1976.

This book is concerned with major strategical approaches to the production of reliable software and also with smaller-scale tactical solutions to various aspects of the unreliability problem. The first part discusses principal causes of software errors. Part 2 contains a large set of principles and practices used in the design of reliable software. The third part covers the broad area of software testing, including some proven principles. Part 4 discusses other variables that affect reliability, including organizational structures, personalities, attitudes, management plans and motivation, programming tools, and the work environment. The subject of reliability is treated solely from the viewpoint of software errors and does not cover the use of software to correct or circumvent hardware failures.

Telecommunications and the Computer, 2nd edition, James Martin (IBM Systems Research Institute, New York, NY), Prentice-Hall, Inc., Englewood Cliffs, NJ, 1976, 676 pp.

The second edition is an updated, detailed review of the workings of telecommunications lines and of their use for data transmission. Included are recent developments in transmission and switching and a discussion of practical communications techniques for new common carrier equipment. The chapter on transmission reviews current aspects of network structure, ac and dc transmission, attenuation and repeaters, frequency, and bandwidth. The chapter on switching technology covers several types, including packet switching networks. A newly added chapter on imperfections in lines and systems deals with noise and distortion, line failures, data errors, and delays and blocking.