# plasma

Research Programs at Hughes Research Laboratories

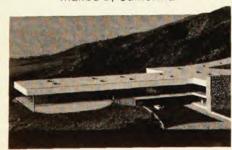
New means for generating and containing highly ionized dense plasmas-new processes to produce controlled fusion powernew concepts on the interaction of electro-magnetic waves with plasmas...These are some of the expanding projects pursued at Hughes Research Laboratories in the field of PLASMA PHYSICS. In Malibu, California, new facilities have been specifically designed for effective and rewarding research effort.

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# Calendar

Material for inclusion in the calendar and meeting sections should be received 6 weeks prior to the date of the issue in which it is to appear. Further information can be obtained by writing to the ad-dresses indicated in parentheses.

#### March

- 21-22 Classical & Quantum Turbulence, British Phys. Soc. Conf., Oxford (Miss A. C. Stickland, 1 Lowther Gardens, London S. W. 7, England)
- American Physical Society, Hotel Sheraton-Cadillac, Detroit, Mich. tel Sheraton-Cadillac, Detroit, Mich. (K. K. Darrow, 538 W. 120 St., New York 27, N. Y.)
- APS Div. of Solid-State Physics, Hotel Sheraton-Cadillac, Detroit, Mich. (E. Burstein, U. of Pa., Philadelphia 4, Pa.)
- 21-24 IRE Internat'l Convention, Waldorf-Astoria Hotel & NY Coliseum, NYC (Inst. of Radio Eng., 1 E. 79 St., New York 21, N. Y.)
- APS Div. of High-Polymer Physics, Park-Shelton Hotel, De-troit, Mich. (T. L. Smith, Stanford Research Inst., Menlo Park, Calif.)
- Optical Spectrometric Measurements of High Temperatures Symp., U. of Chicago (F. Brech, Labs for Applied Science, U. of Chicago, Chicago 37, 111)
- IRE Human Factors in Electronics Symp., attendance limited, NYC (J. E. Karlin, Bell Telephone Labs, Murray Hill, N. J.)
- Mat'l Academy of Sciences—Nat'l Research Council, ann. mtg., Washington, D. C. (NAS-NRC, 2101 Constitution Ave., Washington 25, D. C.)
- AAPT Northern Calif. & South-AAPT Northern Calif. & South-ern Calif. Sections joint mtg., Calif. State Polytechnic Col., San Luis Obispo (Barbara F. Canty, Sacramento State Col., Sacramento
- Nat'l Science Teachers Assoc., ann. conv., Kansas City, Mo. (Beatrice M. Gudridge, Nat'l Education Assoc., 1201 16th St., N. W., Washington 6, D. C.)
- Wm. Beveridge Hall, London U. (The Plastics Inst., 6 Mandeville Pl., London W. 1, England) 30-31

#### April

- Solar Energy Symp., U. of Fla. (J. C. Reed, U. of Fla., Gainesville, 4 5
- 6th Nuclear Congress, NY Coliseum, NYC (F. M. Howell, 29 W. 39 St., New York 18, N. Y.)

  Naval Structural Mechanics, symp. spons'd by ONR & Brown U. at Brown U. (P. S. Symonds, Brown U., Providence 12, R. I.)
- Solid-State Microwave Amplifiers Conf. spons'd by Radio Spectroscopy Group & British Inst. of Physics at U. of Nottingham (Sec'y, The Inst. of Physics, 47 Belgrave Sq., Lon-don S. W. 1, England)
- Inst. of Environmental Sciences mtg. on Hyper-Environments—Space Frontier, Biltmore Hotel, Los Angeles (M. S. Christensen, 6251 Marita St., Long Beach 15, Calif.) 6-8
- Optical Society of America, Hotel Statler, Washington, D. C. (Mary Warga, 1155 16th St., N.W., Washington 6, D. C.)

- APS Southeastern Sect., ORNL host, Gatlinburg, Tenn. (H. Carr, Ala. Polytechnic Inst., Auburn, Ala.)
- APS New England Section, Worcester Polytechnic Inst., Worcester, Mass. (P. J. Bray, Brown U., Provi-dence 12, R. I.)
- Inter-Society Color Council, ann. mtg., Philadelphia Museum Col. of Art, Philadelphia, Pa. (R. M. Evans, Eastman Kodak Co., Bldg. 65, Rochester 4, N. Y.) 11-12
- Physics Club of Chicago (Contemplative Experiments Using Satellites, by C. Hanize), Hamilton Hotel, Chicago (E. L. Bussell, W. M. Welch Mfg. Co., 1515 Sedgwick St., Chicago 10, 1ll.)
- Gas Chromatography Symp., Canisius Col. (H. A. Szymanski, Canisius Col. (H. A. Szymanski, Canisius Col., 2001 Main St., Buffalo 8, N. Y.)
- Active Networks & Feedback Systems, internat'l symp., Engineering Societies Bldg., NYC (H. J. Carlin, Microwave Research Inst., 55 Johnson St., B'klyn 1, N. Y.)
- Metallurgy of Plutonium, internat'l symp. incl. session on nuclear fuels, Grenoble (Soc. Française de Métallurgie, 25 rue de Clichy, Paris, France)
- Electronic Conductivity in Organic Solids, conf. spons'd by OOR & ONR at OOR, Duke U. (M. Silver, OOR, Box CM, Duke Station, Durham, N. C.)
- APS New York State Section mtg. on Radio Astronomy & Rocket Probe Studies, Colgate U., Hamilton (O. E. Miller, Bldg. 65, 1669 Lake Ave., Rochester 4, N. Y.)
- 22-23 APS Ohio Section, Antioch Col., Yellow Springs (L. E. Smith, Deni-son U., Granville, Ohio)
- 22-23 High-Temperature Resistance & Thermal Degradation of Polymers Symp., London (Soc. of Chem. Industry, 14 Belgrave Sq., London S. W. 1, England)
- 25-27 Nat'l Academy of Sciences, ann. mtg., Washington, D. C., (NAS, 2101 Constitution Ave., Washington 25, D. C.)
- The Combustion Inst. Western States Sect. spring mtg. spons'd by Lock-heed Aircraft Corp. in Palo Alto (A. L. Berlad, Convair, 5001 Kearney Villa Rd., San Diego 11, Calif.)
- American Physical Society, Sheraton-Park Hotel, Washington, D. C. (K. K. Darrow, 538 W. 120 St., New York 27, N. Y.)
- Thermonuclear Processes Conv., London (Institution of Electrical Eng., Savoy Pl., London W. C. 2, England) 29-30
- Easter Nuclear Physics, British Physical Soc. Conf., Liverpool U. (Miss A. C. Stickland, 1 Lowther Gardens, London S. W. 7, England)
- Celebration of Centenary of the Discovery of Applied Spectroscopy by Bunsen & Kirchhoff, Heidelberg (G. Scheibe, Marsbruckstr. 186, Dortmund-Atlerbeck, Germany)

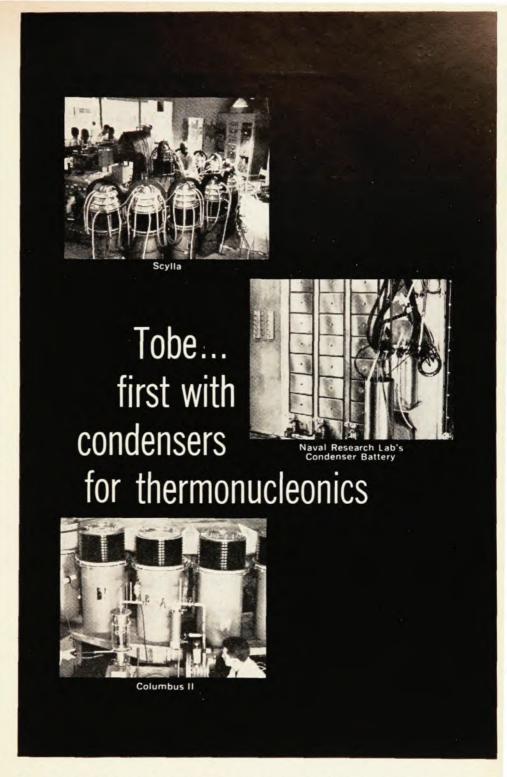
#### 1960 May

- Reactions between Complex Nuclei, APS a sponsor, Gatlinburg (R. S. Livingston, Oak Ridge Nat'l Lab, Oak Ridge, Tenn.)
- Semiconductor Symp. of Electro-chem. Soc., LaSalle Hotel, Chicago, Ill. (N. B. Hannay, Bell Telephone Labs, Murray Hill, N. J.)
- 3-6 Fuel Element Fabrication with spe-cial Emphasis on Cladding Materials, Internat'l Atomic Energy Agency symp., Vienna (IAEA, 11 Kärntner Ring, Vienna 1, Austria)
- 9-12 Am. Rocket Soc., mtg. & astro-nautical exposition, Ambassador Ho-tel, Los Angeles, Calif. (R. L. Hohl, ARS, 500 Fifth Ave., New York 36, N. Y.)
- 17-18 Superconductive Techniques for Comouting Systems Symp., spons'd by ONR Information Systems Branch in Dept. of Interior Auditorium, Washington, D. C. (Miss J. Leno, Code 430A, Office of Naval Research, Washington 25, D. C.)
- 25-26 Refractory Materials & Alloys, Metal-lurgical Soc. of AIME symp., Mc-Gregor Center, Wayne St. U. (C. L. Corey, Wayne St. U., Detroit 2, Mich.)
- Reactivity of Solids, 4th Internat'l Symp. spons'd by IUPAP & IUPAC, Amsterdam (G. van Gijn, Technische Hogeschool, Eindhoven, Netherlands)
- Frequency Control Symp. spons'd by US Army Signal Res. & Dev. Lab, Shelburne Hotel, Atlantic City (E. A. Gerber, US Army Signal R&D Lab, Fort Monmouth, N. J.)

#### June

- 1-3 ISA Instrumental Methods of Analysis Symp., Montreal, Canada (Instrument Soc. of America, 313 Sixth Ave., Pittsburgh 22, Pa.)
  8-11 Canadian Assoc. of Physicists, ann. cong., Kingston, Ont. (G. D. Scott, U. of Toronto, Toronto, Ont., Canada)
- 9-11 Acoustical Society of America, Brown U. (R. B. Lindsay, Brown U., Providence 12, R. I.)
- 13-15 Nat'l Microscopy Symp. spons'd by McCrone Assoc., Del Prado Hotel, Chicago (W. C. McCrone Associates, 501 E. 32 St., Chicago 16, Ill.)
- 13-17 Molecular Structure & Spectroscopy Symp., Ohio State U. (R. A. Oetjen, Ohio State U., Columbus 10, Ohio)
- 13-18 Many Particle Problems, conf. spon-s'd by IUPAP & Dutch Physical Soc., by invitation, Utrecht (Inst. for Theor. Physics, Maliesingel 23, Utrecht, Netherlands)
- 14-18 Macromolecules, internat'l IUPAC symp., Moscow (V. A. Kargin, I Akademitscheki Proyezd No. 18, Moscow V-134, USSR)
- 15-17 American Physical Society,
  Sheraton-Mount Royal Hotel, Montreal, Canada (K. K. Durrow, 538 W.
  120 St., New York 27, N. Y.)
  15-17 1960 Heat Transfer & Fluid Mechanics Inst., Stanford U. (K. Karamcheti, Stanford U., Stanford,
  Calii)
- 20-22 Atomic & Molecular Gas Beams Symp., by invitation, U. of Denver (G. Miller, Denver Research Inst., U. of Denver, Denver 10, Colo.)
- 21-30 Internat'l Nuclear Power Exhibition, Earls Court, London (Nuclear Power Exhib. Ltd., Francis House, Francis St., London S. W. 1, England)
- 22-24 Electronic Standards & Measurements Conf. spons'd by NBS, IRE, AIEE, at NBS Labs, Boulder, Colo. (H. Finke, Polytech. Res. & Dev. Co., 202 Tillary St., Brooklyn 1, N. Y.)

**MARCH 1960** 



Of particular interest to the thousands of international visitors to the historic Geneva Atoms-For-Peace Conference, was the display of thermonuclear fusion research equipment which the U.S. Government set up. Significantly, several of these devices use Tobe low-inductance condensers. Three of the machines are shown here.

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Mr. R. E. Flory, Dept. RL-1C RCA Laboratories Princeton, New Jersey

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Loyola University of Los Angeles continues to need a theoretical physicist for September 1960, interested in teaching upper division undergraduate courses as well as in private research. He should hold a Ph.D. from an American University. An experienced teacher with industrial as well as academic experience will be preferred. Address:

The Dean of the College of Arts & Sciences
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#### POSITION WANTED

EXPERIMENTAL PHYSICIST—Female, B.Sc. and M.Sc. degrees—Excellent scholastic record, seeking challenging position in solid state physics but will also consider Nuclear field. Academic background in both Physics and Chemistry—Location between N. Y. vicinity and Philadelphia preferred—Write Miss Harriet Corbett, Box 7, Wyncote, Pa.

### New

#### 1960

- 23-25 American Association of Physics Teachers, Oberlin Col., Oberlin, Ohio (F. Verbrugge, U. of Minnesota, Minneapolis 14, Minn.)
- Mass Spectrometry, ann. mtg., spon-s'd by ATSM Comm. E-14, Atlantic City, N. J. (V. H. Dibeler, Nat'l Bureau of Standards, Washington 25,
- 27-29 Military Electronics Convention spons'd by IRE Prof. Group on Military Electronics, Sheraton-Park Hotel, Washington, D. C. (C. De Vore, 3224 16th St., N.W., Washington 10, D. C.)
- Radiation Dosimetry in Physical Sciences, Internat'l Atomic Energy Agency symp., Vienna (IAEA, 11 Kärntner Ring, Vienna 1, Austria)

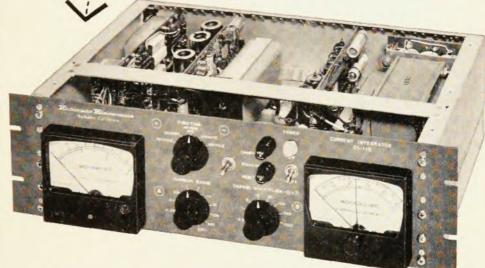
- Polarization Phenomena of Nucleons, IUPAP symp., Basel (P. Huber, Universität, Basel, Switzerland)
- Response of Materials to High-Velocity Deformation, Metallurgical Soc. of AIME conf., Estes Park, Colo. (Metallurgical Soc. of AIME, 29 W. 39 St., New York 18, N. Y.)
- Creep in Structures, IUTAM symp., Stanford (N. J. Hoff, Stanford U., Stanford, Calif.)
  Medical Electronics, internat'l conf. & exhibition, Olympia, London, England (L. B. Lusted, U. of Rochester School of Medicine, Rochester 20, N. Y.)
- Internat'l Union of Geodesy & Geophysics, Helsinki, Finland (W. E. Smith, Am. Geophys. Union, 1530 P St., N.W., Washington 5, D. C.)
  Computers & Data Processing Sympo of Denver Research Inst., Stanley Hotel, Estes Park (W. H. Eichelberger, Denver Research Inst., U. of Denver, Denver 10, Colo.)
  Physics Education, internat'l IUPAP conf., attendance limited, UNESCO House, Paris, France (N. Clarke, Inst. of Physics, 47 Belgrave Sq., London S. W. 1, England)
  Role of Science in the Advancement of New States, internat'l conf., Rehovoth, Israel)

#### August

- 3-6 Rarefied Gas Dynamics, 2nd internat'l symp., by invitation, at U. of Calif., Berkeley (Eng. & Sciences Ext., U. of Calif., 2451 Bancroft Way, Berkeley 4, Calif.)
- 9-12 Inelastic Scattering of Neutrons in Solids & Liquids, Internat'l Atomic Energy Agency symp., Vienna (IAEA, 11 Kärntner Ring, Vienna 1, Austria)
- 11 Kärntner Ring, Vienna 1, Austria)
  15-24 Internat'l Union of Crystallography at Cambridge, Eng.: 5th Gen. Assembly & Internat'l Cong. (D. W. Smits, 10 Bloemsingel, Groningen, Netherlands); Symposia on Aug. 23-24 (W. H. Taylor, Cavendish Lab, Cambridge, England)
  18-31 Cosmical Gas Dynamics Symp. spons'd by IAU & IUTAM, by invitation, Varenna, Italy (R. N. Thomas, Nat'l Bureau of Standards, Boulder, Colo.)
- 22-24 Lattice Defects & the Mechanical Properties of Solids Symp. spons'd by IUPAP in assoc. with IUCr, Cambridge (P. B. Hirsch, Cavendish Lab, Free School Lane, Cambridge, England)
- Inter-American Nuclear Energy Comm., Washington, D. C. (Div. of Science Dev., Pan American Union, Washington 6, D. C.)
- Cryogenic Engineering Conf. spons'd by U. of Colo. & NBS in Boulder (K. D. Timmerhaus, U. of Colo., Boulder, Colo.)

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The Chemstrand Research Center now in Decatur, Alabama, will relocate in late 1960 to new, modern well-equipped laboratories in the Research Triangle Park of North Carolina. Attractive professional, educational, cultural, recreational and residential facilities are available in this location in the Raleigh-Durham-Chapel Hill area.

Representatives of the Chemstrand Research Center (a wholly-owned subsidiary of The Chemstrand Corporation) will be attending the American Physical Society meeting in Detroit, Michigan, March 20–24. For local interview call Mr. R. H. Helle, Sheraton-Cadillac Hotel, Detroit, Michigan, or send resume to

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#### 1960

- High-Energy Nuclear Physics, IUPAP conf., by invitation, U. of Rochester (W. A. Jamison, U. of Rochester, Rochester 20, N. Y.)
- Electron Microscopy, European Regional Conf. organized by Nederlandse Vereniging voor Electronenmicroscopie under auspices of Internat'l Fed. of Electron Microscope Soc's., Delft (A. L. Houwink, Julianalaan 67A, Delft, Netherlands)
- 8th Internat'l Symp. on Combustion, Calif. Inst. of Tech. (S. S. Penner, Calif. Inst. of Tech., Pasadena, Calif.)
- Internat'l Conf. on Semiconductor Physics, IUPAP & Czech. Acad. of Sciences, Prague (M. Matyas, Inst. of Technical Physics, Cukrovarnicka 10, Prague 5, Czechoslovakia)
- Nuclear Structure, IUPAP colloq., Queen's U., Kingston, Ont. (L. G. Elliott, Atomic Energy of Canada, Chalk River, Ont., Canada)

  Low-Temperature Physics, internat'l conf., IUPAP, Toronto (A. C. H. Hallett, U. of Toronto, Toronto 5, Ont., Canada)
- Ont., Canada)
  Internat'l Congress of Theoretical & Applied Mechanics, IUTAM, Stresa, Italy (H. L. Dryden, 1512 H St., N.W., Washington 25, D. C.)

#### September

- 5-15 Internat'l Scientific Radio Union, London, England (URSI, 7 place Emile Danco, Brussels 18, Belgium)
- Canadian High-Polymer Forum spons'd by Nat'l Research Council & Chemical Inst. of Canada, Alpine Inn, St. Marguerite, P. Q. (D. A. I. Goring, McGill U., Montreal, P. Q., Canada)
- 8-10 Internat'l Union of Pure & Applied Physics, general assem., Ottawa, Canada (P. Fleury, Inst. d'Optique, 3 blvd. Pasteur, Paris 15, France)

  12-14 Instrumentation for High-Energy Physics, IUPAP conf., by invitation, Lawrence Rad. Lab (E. J. Lofgren, Lawrence Radiation Lab, U. of Calif., Berkeley 4, Calif.)
- 12-16 Atomic Masses, IUPAP colloq., attendance limited, McMaster U. (H. E. Duckworth, McMaster U., Hamilton, Ont., Canada)
- 12-16 Internat'l Council of the Aeronautical Sciences Cong., Zurich, Switzerland (Inst. of The Aeronautical Sciences, 2 E. 64 St., New York 21, N. Y.)
- 13-15 Instruments & Measurements Conf., internat'l, Stockholm (H. von Koch, Royal Inst. of Technology, Stockholm 70, Sweden)
- 22-23 High-Temperature Resistance Thermal Degradation of Polymers Symp., London (Soc. of Chem. In-dustry, 14 Belgrave Sq., London S. W. 1, England)
- AMPERE Conf., Pisa (A. Gozzini, Inst. di Fisica, Piazza Torricelli, Pisa, Italy)

#### October

- 4-22 Internat'l Comm. of Weights & Measures mtg. at Sevres & gen. conf. in Paris (Oct. 11-19) (Bur. Internat'l des Poids & Mesures, Pavillon de Breteuil, Sevres, France)
- de Breteuut, Sevres, France)

  12-14 Gaseous Electronics Conf. spons'd by

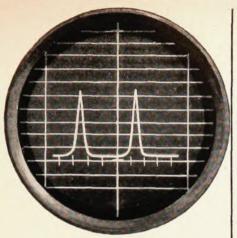
  APS Div. of Electron Physics &

  US Naval Postgraduate School at US

  Naval Postgraduate School (N. L.

  Oleson, US Naval Postgraduate

  School, Monterey, Calif.)
- 13-15 Optical Society of America, Somerset Hotel, Boston, Mass. (Mary Warga, 1155 16th St., N.W., Wash-ington 6, D. C.)





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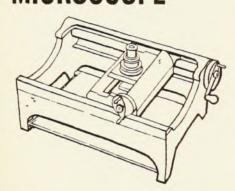
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Reference.....Page 7

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#### 1960

- Acoustical Society of America, Sheraton-Palace Hotel, San Fran-cisco (V. Salmon, Stanford Research Inst., Menlo Park, Calif.) 20-22
- 24-27 Chemical Effects of Nuclear Transformation, Internat'l Atomic Energy Agency symp., Vienna (IAEA, 11 Kärntner Ring, Vienna 1, Austria)
- Society of Rheology, Mellon Inst., Pittsburgh, Pa. (W. R. Willets, Titanium Pigment Corp., 99 Hudson St., New York 13, N. Y.) 31 - 2

#### November

25-26 American Physical Society, Chicago, Ill. (K. K. Darrow, 538 W. 120 St., New York 27, N. Y.)

#### December

- 12-15 Atomic Industrial Forum mtg. at Fairmont Hotel & exhibition at Calif. Masonic Memorial Temple, San Francisco, Calif. (AIF, 3 E. 54 St., New York 22, N. Y.)
- American Physical Society, Berkeley, Calif. (W. A. Nierenberg, U. of Calif., Berkeley 4, Calif.)

#### 1961

#### January

American Physical Society, Hotel New Yorker, NYC (K. K. Darrow, 538 W. 120 St., New York 27, N. Y.)

#### March

American Physical Society, US Naval Postgraduate School, Monte-rey (W. A. Nierenberg, U. of Calif., Berkeley 4, Calif.) 22-24

#### April

American Physical Society, Nat'l Bureau of Standards, Washing-ton, D. C. (K. K. Darrow, 538 W. 120 St., New York 27, N. Y.) 24-27

#### June

American Physical Society, U. of Mexico, Mexico City (K. K. Darrow, 538 W. 120 St., New York 27, N. Y.) 22-24

#### July

High-Energy Nuclear Physics, IUPAP conf., Geneva, Switzerland (R. E. Marshak, U. of Rochester, Rochester, N. W. W.

#### September

- American Physical Society, U. of Seattle, Seattle, Wash. (W. A. Nierenberg, U. of Calif., Berkeley 4,
- Magnetism, IUPAP colloq., Tokyo, Japan (P. Fleury, 3 blvd. Pasteur, Paris 15, France)

#### Dates not yet known 1960

Summer Memorial Crystallographic Cong., Leningrad, USSR (M. J. Buerger, Mass. Inst. of Tech., Cambridge 39, Mass.)

Summer Actinometry & Atmospheric Optics Conf., Vilnius (Inst. of Geology & Geography, Academy of Sciences of the Lithuanian SSR, Vilnius, Lithuanian SSR)

#### 1961

- High-Energy Accelerators & Instru-mentation, internat'l IUPAP conf., Brookhaven Nat'l Lab, Upton, N. Y. (P. Fleury, 3 blvd. Pasteur, Paris 15,
- September Magnetism, IUPAP colloq., Tokyo, Japan (P. Fleury, 3 blvd. Pasteur, Paris 15, France)

### **Theoretical Solid State Physicist**

Battelle is currently in the process of expanding and augmenting its activities in the area of solid state physics. The initial phase of this expansion will be the addition of ten to twelve men to the existing theoretical group. This will be accompanied by expansion of associated experimental activities.

The personnel of the group will have several functions. At least half of each man's time will be devoted to fundamental research in his own field, supported in a large measure by Institute funds. The remainder of his time will be devoted to assistance to other divisions of the Institute in applied research programs in the area of his specialization.

It is planned to add as soon as possible two men whose qualifications include a Ph.D. degree in theoretical physics. One of these men should primarily be interested in imperfections in solids while the other should have research interests in the electronic structure of metals. These specific needs arise, of course, out of Battelle's extensive interests in the property and structure of metals. Future needs will be of the same general nature although as the group grows, other facets of solid state theory will be encompassed.

For additional information you are invited to write directly to:

Dr. Frederick J. Milford Mathematical Physics Division

#### **Battelle Memorial Institute**

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