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harder to get moving. Fewer data are available in the gamma-ray region of the spectrum, in large part as a result of the low sensitivity of the instruments.

Gamma Ray Astronomy, by Rodney Hiller of the University of Bristol, is a careful treatment of the entire field. He begins by discussing the processes by which gamma rays are generated, including synchrotron radiation, Compton scattering and bremsstrahlung, and goes on to discuss how the gamma-ray background limits observations. Because so much of the limitation on our knowledge is due to low instrumental sensitivity, he discusses telescopes based on Compton scattering, the workings of spark chambers and detection of atmospheric Cherenkov radiation in air showers caused by gamma rays.

The second half of the book is devoted to a survey of gamma rays from a wide variety of celestial sources. Gamma rays from solar flares merit their own chapter. Another chapter deals with gamma rays from the Galactic disk. Topics covered in the chapter on discrete Galactic gamma-ray sources include pulsars, supernova remnants and molecular clouds. Hiller discusses the

results of the COS-B satellite, including the 20-odd Galactic sources it found. He considers the gamma-ray spectral lines from electron-positron annihilation in the Galactic-center region. Further, he analyzes the gamma-ray bursts, which have been observed at the rate of a few per year. A final chapter considers extragalactic gamma-ray sources and the diffuse background radiation. All Hiller's treatments deal both with the underlying physics and with the observational data. He freely uses physics at the level of a graduate student in astronomy.

Graphs and diagrams are provided as appropriate. Each chapter contains journal references. The index is briefer and less complete than it should be: For example, the COS-B entry refers only to passages about the telescope, not to discussions of the scientific results.

Gamma-ray astronomy is still at a stage where it can be covered in a single volume, and Hiller has done a thorough job. All graduate students considering doing high-energy astrophysics and all researchers in the field should become familiar with this excellent book.

JAY M. PASACHOFF
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new books

Astronomy, cosmology and space physics

Dynamics of Comets: Their Origin and Evolution. *Astrophysics and Space Science Library 115.* Proc. IAU Colloq., Rome, June 1984. 439 pp. A. Carusi, G. B. Valsecchi, eds. Reidel, Boston, 1985. \$59.50

Ices in the Solar System. Proc. Wksp., Nice, France, January 1984. J. Klinger, D. Benest, A. Dollfus, R. Smoluchowski, eds. 954 pp. Reidel, Boston, 1985. \$99.00

Molecular Astrophysics: State of the Art and Future Directions. Proc. Wksp., Bad Windsheim, FRG, July 1984. G. H. F. Dierksen, W. F. Huebner, P. W. Langhoff, eds. 744 pp. Reidel, Boston, 1985. \$89.00

Radio Stars. *Astrophysics and Space Science Library 116.* Proc. Wksp., Boulder, Colo., August 1984. R. M. Hjellming, D. M. Gibson, eds. 411 pp. Reidel, Boston, 1985. \$59.00

Seismology of the Sun and the Distant Stars. Proc. NATO Adv. Wksp., Cambridge, England, June 1985. D. O. Gough, ed. 479 pp. Reidel, Boston, 1986. \$79.00

Space Remote Sensing Systems: An Introduction. H. S. Chen. 257 pp. Academic, New York, 1985. \$65.00 hardcover; \$39.95 paper. Text

Stability of the Solar System and Its Minor Natural and Artificial Bodies. Proc. NATO Adv. Study Inst., Cortina d'Ampezzo, Italy, August 1984. V. G. Szebehely, ed. 424 pp. Reidel, Boston, 1985. \$54.00

Star-Forming Dwarf Galaxies and Relat-

ed Objects. D. Kunth, T. X. Thuan, J. Tran Thanh Van, eds. 517 pp. Editions Frontières, Gif-sur-Yvette, France, 1986. Price not stated

The Sun and the Heliosphere in Three Dimensions. *Astrophysics and Space Science Library Proceedings 123.* Proc. Symp., Diablerets, Switzerland, June 1985. R. G. Marsden, ed. 525 pp. Reidel, Boston, 1986. \$79.00

Atomic, molecular and chemical physics

Fundamental Processes in Atomic Collision Physics. Proc. NATO Adv. Study Inst., Santa Flavia, Italy. H. Kleinpoppen, J. S. Briggs, H. O. Lutz, eds. 793 pp. Plenum, New York, 1985. \$79.50

Phenomena Induced by Intermolecular Interactions. G. Birnbaum, ed. 792 pp. Plenum, New York, 1985. \$125.00. *Compendium*

Biological and medical physics

Antennas and Reaction Centers of Photosynthetic Bacteria. *Springer Series in Chemical Physics 42.* Proc. Int. Wksp., Feldafing, FRG, March 1985. M. E. Michel-Beyerle, ed. 367 pp. Springer-Verlag, New York, 1985. \$39.00

Evolution as Entropy: Towards a Unified Theory of Biology. D. R. Brooks, E. O. Wiley. 335 pp. U. of Chicago P., Chicago, 1986. \$25.00. *Monograph*

Energy and environment

Solar Energy, Book II: Selected Reprints. L. Hodges, ed. 135 pp. AAPT, College Park, Md., 1986. \$10.00

Fluids and plasmas

Flow Visualization III. Proc. Int. Symp., Ann Arbor, Mich., September 1983. W. J. Yang, ed. 889 pp. Hemisphere, New York, 1985. \$95.00

Kinetic Theory of Particles and Photons: Theoretical Foundations of Non-LTE Plasma Spectroscopy. Springer Series in Electrophysics 20. J. Oxenius. 353 pp. Springer-Verlag, New York, 1986. \$46.00. *Monograph*

Physics of Plasma-Wall Interactions in Controlled Fusion. Proc. NATO Adv. Study Inst., Val-Morin, Quebec, July-August 1984. D. E. Post, R. Behrisch, eds. 1183 pp. Plenum, New York, 1986. \$145.00

Tokamak Start-up: Problems and Scenarios Related to the Transient Phases of a Thermonuclear Fusion Reactor. *Etude Majorana International Science Series* 26. Proc. Int. Sch., Erice, Sicily, July 1985. H. Knoepfel, ed. 432 pp. Plenum, New York, 1986. \$75.00

History and philosophy

Early History of Cosmic Ray Studies. *Astrophysics and Space Science Library* 118. Y. Sekido, H. Elliot, eds. 444 pp. Reidel, Boston, 1985. \$89.00

The Mars Project: Journeys Beyond The Cold War. S. M. Matsunaga. 216 pp. Hill and Wang, New York, 1986. \$17.95

Magnetic Tape Recording. M. Camras, ed. 445 pp. Van Nostrand Reinhold, New York, 1985. \$54.50. *Collection of historical papers*

Manhattan: The Army and the Atomic Bomb. V. C. Jones. 660 pp. US Army Center of Military History, Washington, D.C., 1985. \$21.00

Medieval Cosmology: Theories of Infinity, Place, Time, Void, and the Plurality of Worlds. P. Duhem. 601 pp. U. of Chicago P., Chicago, 1985. *Abridged translation*

Science in the Provinces: Scientific Communities and Provincial Leadership in France, 1860-1930. M. J. Nye. 328 pp. U. of California P., Berkeley, 1986. \$39.95. *Monograph*

The Making of American Industrial Research: Science and Business at GE and Bell, 1876-1926. L. S. Reich. 309 pp. Cambridge U.P., New York, 1985. \$24.95

By the Bomb's Early Light: American Thought and Culture at the Dawn of the Atomic Age. P. Boyer. 440 pp. Pantheon, New York, 1985. \$22.50

Thermodynamics and statistical physics

Teaching Thermodynamics. Proc. Wksp., Cambridge, England, September 1984. J. D. Lewins, ed. 517 pp. Plenum, New York, 1985. \$79.50

The Second Law. P. W. Atkins. 230 pp. Scientific American Books, New York, 1986. \$29.95. *Lay readers*

The Thermodynamics of Fluid Systems. *Oxford Engineering Science Series* 2. L. C. Woods. 359 pp. Oxford U.P., New York, 1986. \$24.95. *Text*

Statistical and Thermal Physics, Parts I and II. S. Fujita. 520 + 529 pp. Robert E. Krieger, Melbourne, Fla., 1986. \$49.00. *Text*

Instrumentation and techniques

Aberration Theory in Electron and Ion Optics. *Advances in Electronics and Electron Physics, Supplement* 17. X. Jiye. 433 pp. Academic, New York, 1986. \$49.50. *Monograph*

BASIC Molecular Spectroscopy. P. A. Gorry. 144 pp. Butterworths, Stoneham, Mass., 1985. \$15.95. *Text*

Reactor Dosimetry: Dosimetry Methods for Fuels, Cladding and Structural Materials. (2 vols.) Proc. Symp., Geesthacht, FRG, September 1984. J. P. Genton, H. Rottger, eds. 1043 pp. Reidel, Boston, 1985. \$118.00

Scanning Electron Microscopy: Physics of Image Formation and Microanalysis. Springer Series in Optical Sciences 45. L. Reimer. 457 pp. Springer-Verlag, New York, 1985. \$39.00. *Text*

The Principles and Practice of Electron Microscopy. I. M. Watt. 303 pp. Cambridge U.P., New York, 1985. \$49.50. *Text*

Total Pressure Measurements in Vacuum Technology. A. Berman. 396 pp. Academic, New York, 1985. \$59.50. *Monograph*

Materials science and condensed matter

Contribution of Cluster Physics to Materials Science and Technology. Proc. NATO Adv. Study Inst., Cap d'Agde, France, June 1982. J. Davenas, P. M. Rabette, eds. 646 pp. Nijhoff, Boston, 1986. \$100.00

Radiant Properties of Materials: Tables of Radiant Values for Black Body and Real Materials. *Physical Sciences Data* 21. A. Sala. 479 pp. Elsevier, New York, 1986. \$125.00

Solid State Physics under Pressure: Recent Advances with Anvil Devices. S. Minomura, ed. 382 pp. Reidel, Boston, 1985. \$69.00. *Compendium*

Theory of Heavy Fermions and Valence Fluctuations. Springer Series in Solid-State Sciences 62. Proc. Symp., Shima Kanko, Japan, April 1985. T. Kasuya, T. Saso, eds. 287 pp. Springer-Verlag, New York, 1985. \$27.50

Seminar on Deformations. *Lecture Notes in Mathematics* 1165. Proc. Sems., Łódź, Poland, 1982-84. J. Lawrynowicz, ed. 331 pp. Springer-Verlag, New York, 1985. \$20.50

Optics

Engineering Optics. Springer Series in Optical Sciences 35. K. Iizuka. 489 pp.

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Optical Instabilities. *Cambridge Studies in Modern Optics* 4. Proc. Int. Mtg., Rochester, N.Y., June 1985. R. W. Boyd, M. G. Raymer, L. M. Narducci, eds. 396 pp. Cambridge U.P., New York, 1986. \$42.50

Particles, nuclei and high-energy physics

A Passion for Physics: Essays in Honor of Geoffrey Chew, Including an Interview with Chew. C. DeTar, J. Finkelstein, C.-I. Tan, eds. 301 pp. Taylor and Francis, Philadelphia, 1985. \$33.00

Frontiers in Nuclear Dynamics. Proc. Int. Sch., Erice, Sicily, July 1984. R. A. Broglia, C. H. Dasso, eds. 402 pp. Plenum, New York, 1985. \$69.50

Hadrons and Heavy Ions. *Lecture Notes in Physics* 231. Proc. Conf., Cape Town, January 1984. W. D. Heiss, ed. 458 pp. Springer-Verlag, New York, 1985. \$33.50

Nucleon-Nucleon and Nucleon-Antinucleon Interactions. Proc. Mtg., Schladming, Austria, February 1983. H. Mitter, W. Plessas, eds. 724 pp. Springer-Verlag, New York, 1985. \$70.90

Positron Annihilation. Proc. Int. Conf., New Delhi, January 1985. P. C. Jain, R. M. Singru, K. P. Gopinathan, eds. 1048 pp. World Scientific, Singapore (US dist. Taylor and Francis, Philadelphia), 1985. \$144.00

Physics in Collision 4. Proc. Int. Conf., Santa Cruz, Calif., August 1984. A. Seiden, ed. 516 pp. Editions Frontières, Gif-sur-Yvette, France, 1985. *Price not stated*

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Picosecond Electronics and Optoelectronics. Springer Series in Electrophysics 21. Proc. Mtg., Lake Tahoe, Nev., March 1985. G. A. Mourou, D. M. Bloom, C.-H. Lee, eds. 258 pp. Springer-Verlag, New York, 1985. \$29.00

Solid-state physics and electronics

Amorphous Semiconductors. Second edition. *Topics in Applied Physics* 36. M. H. Brodsky, ed. 343 pp. Springer-Verlag, New York, 1986. \$24.50. *Compendium*

Amorphous Silicon Solar Cells. K. Takahashi, M. Konagai. 225 pp. Wiley, New York, 1986. \$68.00. *Monograph*

Electronic Excitations in Condensed Rare Gases. Springer Tracts in Modern Physics 107. N. Schwentner, E.-E. Koch, J. Jortner. 239 pp. Springer-Verlag, New York, 1985. \$34.00. *Monograph*

Electronic Properties of Polymers and Related Compounds. Springer Series in Solid-State Sciences 63. Proc. Int. Wint. Sch., Kirchberg, Tirol, February-March 1985. H. Kuzmany, M. Mehring, S. Roth, eds. 354 pp. Springer-Verlag, New York, 1985. \$34.50

Gallium Arsenide: Materials, Devices, and Circuits. M. J. Howes, D. V. Morgan, eds. 580 pp. Wiley, New York, 1985. \$61.95. *Compendium* □