J. D. Jackson

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John David Jackson (born January 19, 1925) is a Canadian–American physics professor emeritus at the University of California, Berkeley and a faculty senior scientist emeritus at Lawrence Berkeley National Laboratory.) A theoretical physicist, he is a member of the National Academy of Sciences, and is well known for numerous publications and summer-school lectures in nuclear and particle physics, as well as his widely used graduate text on classical electromagnetism.[1]

John David Jackson
Born January 19, 1925 (1925-01-19) (age 86)
London, Ontario, Canada
Nationality American; naturalized, 1988
Fields Physicist
Institutions:
MIT
McGill University
University of Illinois
University of California, Berkeley
Lawrence Berkeley National Laboratory
Alma mater: University of Western Ontario
MIT
Doctoral advisor : Victor Frederick Weisskopf
Notable awards: Hon. D.Sc., University of Western Ontario, 1989

Contents

1. Education

Born in London, Ontario, Canada, Jackson attended the University of Western Ontario, receiving a B.Sc. in honors physics and mathematics in 1946. He went on to graduate study at MIT, where he worked under Victor Frederick Weisskopf, completing his Ph.D. thesis in 1949.[2]

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2. Academic career

Jackson held academic appointments successively at McGill University, thanks to Philip Russell Wallace, a prominent Canadian theoretical physicist, (January 1950–1957); then the University of Illinois at Urbana–Champaign (1957–1967); and finally the University of California, Berkeley (1967–). At McGill, he was Assistant and Associate Professor of Mathematics; at Illinois and Berkeley, he was in the Physics Departments. At the latter, he held appointments on campus and at the Lawrence Berkeley National Laboratory. Since retiring from teaching at the beginning of 1993, he has continued to be active at LBNL.

2.1 McGill and Princeton

At McGill in the 1950s, in addition to appreciable teaching, Jackson found time for research on atomic processes and nuclear reactions at intermediate energies and the beginnings of his book on classical electricity and magnetism.

While on leave at Princeton University, he found a fruitful collaboration with Sam Treiman and H. W. Wyld on weak interactions, particularly the various observable decay correlations in allowed nuclear beta decay involving the electron's momentum, its spin, the neutrino's momentum, and the nuclear spin that provide information about parity conservation or non-conservation and time reversal conservation or not.[3][4] He also published an early paper on the then recently discovered muon-catalyzed fusion of hydrogen isotopes.[5][6]

2.2 Illinois and CERN (1963–64)

While at the University of Illinois (1957–1967) Jackson initially continued work on weak interactions as well as strange particle interactions at low energy with Wyld and others. On sabbatical leave at CERN in 1963–64, he collaborated with Kurt Gottfried on production and decay of unstable resonances in high-energy hadronic collisions.[7] They introduced the use of the density matrix to connect production mechanisms to the decay patterns and described the influence of competing processes ("absorption") on the reactions.[8]

During this period Jackson lectured at three summer schools—on dispersion relations at the first Scottish Universities Summer School in Physics, 1960; on weak interactions at the Brandeis Summer Institute, 1962; and on particle and polarization decay distributions at the Summer School of Theoretical Physics, Les Houches, 1965. He also published three books, one on particle physics, based on lectures at the Canadian Summer School in Edmonton and Jasper, 1957;[9] the second, a small book on mathematics for quantum mechanics (1962), and the third also in 1962, the first edition of his text on classical electrodynamics.[1]

2.3 Berkeley

Moving to Berkeley in 1967, Jackson taught on campus, did his research at LBNL, and served in administrative positions at both (Chair, UCB Physics Department, 1978–1981; Head, LBNL Physics Division, January 1982 – June 1984). In the formative years of the ill-fated Superconducting Super Collider project, he served as deputy director of operations of the SSC Central Design Group that did the R&D culminating in the 20 TeV on 20 TeV design accepted by President Reagan in 1987.

In the 1960s and 1970s his research alone and with students focused in journal publications and conference papers on models of high energy processes, radiative and resolution corrections for resonances in electron–positron annihilation, spin-flip synchrotron radiation and the polarization of electrons in a storage ring, and, after November 1974, the spectroscopy of the charm–anticharm particles. In 1973, he lectured again at the Scottish Universities Summer School, on hadronic interactions at high energies, and in 1976 at the SLAC Summer Institute, on charmonium spectroscopy.[10]

In 1973–74 he ran the nascent theory group at Fermilab and co-edited the proceedings of the 1973 "Rochester" Conference.

In January 1977 Jackson began a 17-year stint as Editor of Annual Review of Nuclear and Particle Science. In much of the 1980s he was involved with many others in the high-energy physics community in activities aimed at the next step up in accelerators. Then in 1983 he became active in the R&D for the SSC, and on the program advisory committee for the SSC Laboratory, when it began in Texas in 1988.

3. Retirement years

Jackson retired from teaching in December 1992, but retained his connection with LBNL. In the 1990s and beyond his time was increasingly devoted to semi-historical talks and publications on a variety of topics, with a foray into the controversial (for some) topic of EMF's as a possible cause of cancers.[11] Noteworthy are a continuing series of papers in the American Journal of Physics on diverse topics in electromagnetism, including rebuttals of mistaken ideas. History of physics publications include the historical roots of gauge invariance,[12] examples of the misattribution of discoveries in physics,[13] and the editing of a sequel to R. T. Birge's history of the Berkeley Physics Department.[14]

4. Students

Among his students at McGill, Hubert Reeves, a Master's student, went on to international prominence as an astrophysicist in France. John T. Donohue (now in Bordeaux, France) and Gordon L. Kane (University of Michigan) stand out among his Ph.D. students at Illinois. The Berkeley trio, Bob Cahn (LBNL), Rick Field (University of Florida), and Chris Quigg (Fermilab), are prominent particle theorists.

5. Memberships and Honors

Jackson is a Fellow of the American Physical Society, a Member of the American Academy of Arts and Sciences, and a Member of the National Academy of Sciences. In 1989 he received an Honorary D. Sc. from his alma mater, the University of Western Ontario. In 2009, in recognition of his own contributions to classroom teaching and his influential textbook, the American Association of Physics Teachers created the "J. D. Jackson Award for Excellence in Graduate Education," with the first award in February 2010 to Eugene Commins.

6. References

1. Jackson, J. D. (1962, 1975, 1998). Classical Electrodynamics. New York: John Wiley & Sons. OCLC 535998, ISBN 978-0-471-43132-9, ISBN 978-0-471-30932-1. ISBN 047130932X.
2. Jackson, J. D. and Blatt, J. M. (1950). "The interpretation of low energy proton–proton scattering". Reviews of Modern Physics 22: 77–118. doi:10.1103/RevModPhys.22.77.
3. Jackson, J. D., Treiman, S. B., and Wyld, H. W. (1957). "Possible tests of time reversal invariance in beta decay". Physical Review 106: 517–521. doi:10.1103/PhysRev.106.517.

4. Jackson, J. D., Treiman, S. B., and Wyld, H. W. (1957). "Coulomb corrections in allowed beta transitions". Nuclear Physics 4: 206–212. doi:10.1016/0029-5582(87)90019-8.
5. Alvarez, L. W., et al (1957). "Catalysis of nuclear reactions by μ mesons". Physical Review 105: 1127–1128. doi:10.1103/PhysRev.105.1127.
6. Jackson, J. D. (1957). "Catalysis of nuclear reactions between hydrogen isotopes by negative mu-mesons". Physical Review 106: 330–339. doi:10.1103/PhysRev.106.330.
7. Gottfried, K. and Jackson, J. D. (1964). "On the connection between production mechanism and decay of resonances at high energy". Nuovo Cimento 33: 309–330. doi:10.1007/BF02750195.
8. Gottfried, K. and Jackson, J. D. (1964). "Influence of absorption due to competing processes on peripheral reactions". Nuovo Cimento 34: 735–752. doi:10.1007/BF02750013.
9. Jackson, J. D. (1958). The Physics of Elementary Particles. Princeton University Press. LCCN 58-935, OCLC 536207.
10. Jackson, J. D. (1976). "Lectures on the new particles". SLAC Report 198: 147–202. http://www.slac.stanford.edu/cgi-wrap/getdoc/ssi76-005.pdf.
11. Jackson, J. D. (1992). "Are stray 60 Hz electromagnetic fields associated with the distribution and use of electric power a significant cause of cancer?". Proceedings of the National Academy of Sciences 89: 3508–3510. doi:10.1073/pnas.89.8.3508.
12. Jackson, J. D.and Okun, L. B. (2001). "Historical roots of gauge invariance". Reviews of Modern Physics 73: 663–680. doi:10.1103/RevModPhys.73.663.
13. Jackson, J. D. (2008). "Examples of the zeroth theorem of the history of science". American Journal of Physics 76: 704–719. doi:10.1119/1.2904468.
14. Helmholz, A. C. (2004). Jackson, J. D.. ed. History of the Physics Department, University of California, Berkeley, 1950–1968. University of California, Berkeley, Department of Physics. Contains more recent information in appendices.

7. Further reading

* Jackson, J. D. (1999). "Snapshots of a Physicist's Life". Annual Review of Nuclear and Particle Science 49: 1. doi:10.1146/annurev.nucl.49.1.1.

8. External links

* J. D. Jackson's web site [www-theory.lbl.gov/jdj/]