

Curriculum Vitae

JOACHIM JÄNECKE

Birthdate

5 February 1929, Heidelberg, Germany
Citizenship: U.S.

Education

1947–1955	Ruperto Carola, University of Heidelberg
1952	Dipl. Phys., University of Heidelberg Thesis: Investigation of Dielectric Properties of Liquids near the Critical Point with Microwaves (Professor Christoph Schmelzer)
1955	Dr. rer. nat., University of Heidelberg Thesis: Investigation of Cosmic Ray Showers under Lead with a Cloud Chamber (Professor Walter Bothe, Nobel Prize 1954).

Positions

1955–1960	Research Physicist, Max-Planck-Institut, Heidelberg
1960–1962	Research Associate and Lecturer, The University of Michigan
1962	Research Associate, Florida State University, Tallahassee
1962–1965	Research Physicist, Kernforschungszentrum, Karlsruhe, Germany
1965–1969	Associate Professor of Physics, The University of Michigan
1969–1998	Professor of Physics, The University of Michigan
since 1998	Professor Emeritus, The University of Michigan
1972	Visiting Professor, Max-Planck-Institut, Heidelberg, Germany
1979–1980	Visiting Professor, Kernfysisch Versneller Instituut, Groningen, The Netherlands
1986	Visiting Professor, Tel-Aviv University, Israel
1988,89,91	Visiting Professor, Kernfysisch Versneller Instituut, Groningen, The Netherlands
1993,94,95,97	Visiting Professor, Research Center for Nuclear Physics, Osaka University, Japan
1998	COE Visiting Professor, Research Center for Nuclear Physics, Osaka University, Japan

Memberships, Services, Awards

American Physical Society (Member)
American Physical Society (Fellow 1972)
Sigma Xi (Member)
University of Michigan: several Phoenix and Faculty Research Grants;
Japan Technology Management Grant
Referee: National Science Foundation, U.S.–Israel Binational Science Foundation,
Physical Review Letters, Physical Review, Physics Letters, Nuclear Physics,
Nuclear Instruments & Methods, Canadian Journal of Physics, Atomic Data
and Nuclear Data Tables
Fellowship, Japanese Society for the Promotion of Science (1993)
Associate Editor, Atomic Data and Nuclear Data Tables, Elsevier (1996–present)
Center-of-Excellence Visiting Professor, University of Osaka (1998)

University Committees

1971–1974	German Scholarship Committee, International Center
1977–1978	Executive Board, Rackham Graduate School
1982–1985	Senate Assembly
1984–1986	Classified Research Review Panel
1985	Radiation Control Service Review Committee
1986	Physics Space Planning Committee
1991	Chair, Local Organizing Committee, International Symposium on Group Theory and Special Symmetries in Nuclear Physics, Ann Arbor, September 1991
1986–1998	Radiation Policies Committee Member and Chair, Authorized Users Subcommittee
1966–1998	Numerous Departmental Committees

Research Interests

The scientific career of Professor Jänecke spans several decades beginning in the mid-fifties. It includes experimental and theoretical work in nuclear physics beginning with studies of super-allowed β -decays at the Max-Planck-Institute in Heidelberg. This work was expanded in the early 1960s at the University of Michigan and the Kernforschungszentrum Karlsruhe with experiments at cyclotron accelerators studying direct nuclear reactions. After joining the faculty at the University of Michigan in 1965, work continued using the Michigan 26" and the 83" sector-focused cyclotrons. Most of the work was again on direct one-nucleon transfer reactions, but later broadened with the investigation of multi-nucleon transfer reactions to study cluster structures in atomic nuclei. These reactions were mostly α -particle transfer reactions, such as $(d, {}^6\text{Li})$ and $({}^6\text{Li}, d)$, hence α -particle pick-up and stripping reactions. This work was continued in the user mode into the late 1980s at several national nuclear accelerator

laboratories including the Triple Tandem Accelerator at Brookhaven National Laboratory, the 88" Cyclotron at the Lawrence Berkeley National Laboratory, the Cyclotron Institute at Texas A&M University, and the Indiana University Cyclotron Facility.

Theoretical work was carried out in parallel. These studies were related to the properties of Coulomb energies of atomic nuclei and to specific questions of nuclear isospin and isobaric analog states. A review article was included in the book "Isospin in Nuclear Physics" by D. H. Wilkinson in 1969. In addition, mass equations and mass relations of atomic nuclei were studied later in great detail.

The interest in isobaric analog states led to a program to study the properties of such states using the ($^3\text{He},t$) charge-exchange reaction over a wide range of bombarding energies at several accelerator laboratories. One objective was to determine the excitation energies of isobaric analog states, and hence measure Coulomb displacement energies. Furthermore, proton decay studies were employed to measure escape and spreading widths of these states. The work was performed at the University of Michigan and during visits including two sabbaticals at the Kernfysisch Versneller Instituut, Rijksuniversiteit Groningen, the Netherlands.

Experiments on radioactive ion beams were carried out in collaboration with Professor Becchetti initially at the Atlas Tandem-Linac Accelerator Facility at Argonne National Laboratory followed by experiments at the Nuclear Structure Laboratory at Notre Dame University. Beams of radioactive ions as well as isomeric beams were isolated using systems of superconducting solenoids. Using the principle of inverse kinematics, reaction on unstable targets could thus be investigated. Experiments with isomeric beam were also studied in a separate experimental setup using a superconducting solenoid at the National Superconducting Cyclotron Laboratory at Michigan State University.

The studies of ($^3\text{He},t$) charge-exchange reactions were further extended in the 1990s to higher bombarding energies at the Indiana University Cyclotron Facility and the Research Center for Nuclear Physics in Osaka, Japan. Here, the emphasis was on the investigation of so-called giant resonances, which represent collective excitations of the nuclear many-body system. Excitations of interest include collective spin vibrations (Gamow-Teller resonances) and compression modes (monopole resonances). Attention was given to new experimental techniques for investigating fine structures and decay properties (proton, neutron, and γ -ray emission) permitting the study and interpretation of microscopic structures. The reactions also provide important information about the β -strength function needed in dynamic nucleosynthesis calculations, about double β -decay, about neutrino detection efficiencies, and about the nuclear incompressibility (equation of state; supernovae explosions). Two important extensions of this work were performed at the National Superconducting Cyclotron Laboratory at Michigan State University. The ($^7\text{Li},^7\text{Be}$) charge exchange reaction was used in conjunction with the detection of reaction γ -rays to study special features of giant resonances. Furthermore, a secondary triton beam was generated using a nuclear reaction. The tritons were subsequently used to in-

investigate the inverse charge-exchange reaction ($t, {}^3\text{He}$). Together with inelastic proton scattering experiments, transitions to all members of isospin multiplets could be studied thus providing insight into structure questions not previously available. All the preceding work was performed in the context of international collaborations which included researchers from the United States, the Netherlands, and Japan.

After retirement theoretical work on nuclear binding energies related to isobaric analog states, symmetry energies and mass equations was taken up again initially in collaboration with Professor Goldanskii from Russia.

Status May 2006

Sponsored Research Support

Support 1965–2000:

1965–1975	“Cyclotron Laboratory,” W. C. Parkinson, Principal Investigator, AEC, ERDA, DoE Grants.
1976–1978	“Experimental Nuclear Science,” Co-Principal Investigator with F.D. Becchetti, NSF Grant, 2 years.
1978–1983	“Experimental Nuclear Science,” Co-Principal Investigator with F.D. Becchetti, NSF Grant, 5 years.
1981–1983	“Atomic Masses,” Principal Investigator, NSF Grant, 2 years. OVPR Supplement, 1983.
1983–1986	“Experimental Nuclear Science,” Co-Principal Investigator with F.D. Becchetti, NSF Grant, 3 years.
1984–1987	“Mass Predictions for Nuclear and Astrophysical Studies,” Co-principal Investigator with I. Kelson (Tel-Aviv University, Israel), United States–Israel Binational Science Foundation, Jerusalem, Israel, 3 years.
1985–1988	“Investigation of Isovector Monopole Resonances in Light and Heavy Nuclei,” Co-principal Investigator M.N. Harakeh (KVI Groningen, The Netherlands), Travel Grant 85/0123, NATO Scientific Affairs Division, Brussels, Belgium, 3 years.
1990–1997	“Investigation of Isovector Giant Resonances in Atomic Nuclei,” Co-principal Investigator M. N. Harakeh (KVI Groningen, The Netherlands), Travel Grant 90/0219, NATO Scientific Affairs Division, Brussels, Belgium, 7 years including two extensions.
1997–2000	“Search for Isovector Giant Monopole Resonances in Charge-Exchange Reactions”, Co-principal Investigator M.N. Harakeh (KVI Groningen, The Netherlands), Travel Grant 97/1531, NATO Scientific Affairs Division, Brussels, Belgium, 3 years.
1986–1992	“Experimental Nuclear Science,” Co-Principal Investigator with F. D. Becchetti,

	NSF Research Grants of k\$ 190 to k\$ 272 per year. “Research Experience for Undergraduates” Supplements for several years of k\$ 5–14 per year.
1989–1990	“Rhenium Cosmochronology”, Faculty Research Grant, Horace Rackham School of Graduate Studies, 1 year.
1994–1995	“Shell-Model Mass Equations”, International Partnerships, Horace Rackham School of Graduate Studies, in support of visit from Professor Nissan Zeldes, Hebrew University of Jerusalem.
1994–1996	“Charge-Exchange Reaction and Giant Resonances”, U.S.–Japan Cooperative Research Program, NSF - International, in support of travel to Japan.
1994	“Study of Giant Resonances in Atomic Nuclei”, Japan Technology Management Program, University of Michigan.
1995–1996	“Research Experience for Undergraduates”, Supplement from the National Science Foundation, F.D.Becchetti and J. Jänecke, Co-Principal Investigators: 1995: \$14,300; 1996: \$15,000.
1996–1997	“Experimental Nuclear Science,” Nuclear Physics Division, National Science Foundation, one-year extension (J.J.).
1997–1998	“Deuterated Liquid Scintillator as a Fast Neutron Detector”, Faculty Research Grant, Michigan Phoenix-Memorial Project.
1997–2000	“Research”, Faculty Support from OVPR, LSA, and Physics Department.

Postdoctoral Associates

(1976–1998): L.T. Chua, H. Song, D. Overway, P. Lister, D.A. Roberts

Visitors

Dr. Eliahu Comay, Tel-Aviv University, Israel (1982–1983)

Professor Nissan Zeldes, Hebrew University of Jerusalem, Israel (1988–1989).

Professor Johan van Klinken, Kernfysisch Versneller Instituut, Groningen,
The Netherlands (1989–1990).

Professor Nissan Zeldes, Hebrew University of Jerusalem, Israel (1995).

Dissertation Committee Chairmanships

PhD Recipient	Degree Granted	Title
Yang, Tien-Fang	1969	The $^{12}\text{C}(\text{d},\alpha)^{10}\text{B}$ Reaction; Reaction Mechanism and Cluster Structure
Firestone, Marc	1974	The $^{16}\text{O}(\text{d},^3\text{He})^{15}\text{N}$ Reaction; Reaction Mechanism and Nuclear Structure
VanderMolen, Andrew	1975	Multi-Nucleon Transfer Reactions in Light Nuclei
Milder, Frederic	1976	Alpha-Cluster Pickup on Rare-Earth Nuclei
Al-Bataina, Barakat	1985	Alpha-Particle Decay Measurements for very Long-Lived Quasi-Stable Isotopes of Neodymium, Platinum, Samarium and Uranium
Ashktorab, Karim	1992	Beta-decay and Rhenium Cosmochronology
Thilina Annakkage	1995	Isvector Giant Resonances using ($^7\text{Li},^7\text{Be}$) Charge-Exchange Reactions at 50 MeV/u
Khai Pham	(1997 – not completed)	Direct and Statistical Proton Decay from Isvector Giant Resonances in ^{90}Nb

Member of 21 Disertation Committees in Physics, Nuclear Engineering,
Astronomy, and at the Rijksuniversiteit Groningen, The Netherlands

<http://www.lsa.umich.edu/physics/> (people - emeritus)