

The University
of Kansas
Department of Physics
and Astronomy
Newsletter

Fall 1982

Physics & Astronomy

Memories of Ralph Krone upon His Retirement

After 34 years of service, Professor Ralph Krone has retired. Ralph came to KU in the fall of 1948 as a new Ph.D. from Johns Hopkins University, so fresh, in fact, that his initial appointment was as an instructor until he completed his dissertation and received his degree in 1949.

Those of us who were students here in the late '40s and '50s will remember his courses in Optics and in Atomic Spectra, subjects appropriate for a Hopkins graduate. However, his thesis at Hopkins, done under David R. Inglis, and all of his subsequent research, were in experimental nuclear physics.

Soon after he came to KU, he began working with L. Worth Seagondollar, as Worth supervised the construction of a Van de Graaff electrostatic accelerator. Ralph's major contribution, in those early days of nuclear research at KU, was to build the electronics necessary to carry out research with this machine. The one instrument I remember best was a ten-channel multi-channel analyzer copied from the excellent reference book by Elmore and Sands. It was an impressive, and useful, instrument in those pre-transistor days. We used it, with modifications, through most of the '50s.

Norman Bauman and I were Ralph's first Ph.D. students. As such, we participated in the move of the laboratory and the old Van de Graaff from the Quonset hut behind Blake Hall to the basement of the then new Malott Hall. While there were the normal trials and tribulations involved in this move and the subsequent completion of our theses, I believe Norm would agree with me that we were fortunate to have had Ralph and Worth to work under and to learn from.

When I returned to KU on the faculty in 1957, Ralph had obtained research support from the AEC. This support continued until the end of 1971, when it had become federal policy to concentrate support in national and very large university laboratories. A number of graduates from



Ralph Krone (right) and Frank Prosser working on the new Van de Graaff in 1962.

the KU laboratory during these years have gone on to major roles in research in physics. Among them are Gale Harris, a student of Worth's, who was for many years the head of the Physics Division at the Aerospace Research Laboratory in Dayton, Ohio; and Hobson Wildenthal, a student of Ralph's who has been a major contributor to both theoretical and experimental aspects of nuclear structure.

During these 14 years of AEC support, Ralph's program grew from our original size of two experimentalists and several graduate students to one which consisted of four experimentalists, two theorists, four post-doctoral students, and about ten graduate students. In this span, his support was the largest in the Department and one of the largest in the University, in terms of outside funding.

In 1964, the Laboratory began to sponsor a series of biennial international conferences on the structure of low- and medium-mass nuclei.

While small, these proved to be very worthwhile in the interchange of knowledge among a wide-ranging group of

physicists, and in informing others of the status of research at KU and at the Aerospace Research Laboratory in Dayton.

In 1962, the old Van de Graaff was replaced with a 3 MeV machine, purchased from High Voltage Engineering Corporation with AEC funds. (This machine was later upgraded to 4 MeV.) About the same time, the laboratory moved into the modern age when it took over an IBM 1620 computer (from its former use as the University's main computer) for data acquisition and analysis. This computer was replaced in 1967 by a far more suitable IBM 1800 computer, which continued to be used for nuclear physics research through 1981.

When Professor Stranathan reached the retirement age as chairman in 1965 and the Department agreed on Dr. David Beard as the new chairman, he accepted only on the condition that he be allowed to fulfill a previous commitment to a sabbatical in England. Ralph took on the rather thankless position of acting chairman during the 1965-66 year and did an

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Chairman's Message

The past 1981-1982 year was again a year of many changes for the Department—one which leaves, on the one hand, a large gap among our friends and faculty and, on the other, adds to our effort in astronomy. As you have no doubt already read, Professor Ralph Krone and Sally Krone have left Lawrence and the University of Kansas to spend their retirement years in Sally's old family homestead in central New Hampshire. While the winters there are probably for most of us not a worthwhile exchange, I can, speaking from personal experience, state that the summers are far more pleasant than one generally finds in the central Mississippi valley. We certainly wish Ralph and Sally a very long and prosperous retirement period and hope that they will visit here again from time to time. Ralph certainly has left a very strong imprint on this Department and its ways of operating.

To balance Ralph and Sally's leaving, we are fortunate in having two new Ph.D.'s from Yale who are coming to us by way of the University of Texas at Austin. Barbara Anthony-Twarog and Bruce Twarog have already done a good deal of important research in astronomy and we certainly look forward to having them with us. The interesting fact of their joining us is that they are sharing a single assistant professorship position in this Department. This is the first time such a position sharing has taken place in this Department and as far as I know within the University. We certainly believe that they will have a profound effect on tripling our small astronomy group and we have no doubt that it will strengthen our astronomy undergraduate program immensely.

The astronomer who was with us for a year and a half, Dr. Robert Phillips, left in January of 1982 to take a permanent position at the Haystack Observatory just outside Boston. The Haystack Observatory is operated by MIT. Dr. Phillips was deeply involved in observing superluminous astronomical objects with the VLBI array which is an international and intercontinental radio telescope interferometer. We certainly wish him luck at the Haystack Observatory.

This year also brings another important change in the direction of some of our faculty in that Professor Robert Stump has received a College grant to help him in making a major professional change from high energy elementary particle physics into meteorology and atmospheric physics. Bob Stump spent a period immediately during and following the

second World War involved in meteorology and we look forward to his making a very vigorous contribution in this new area of physical science. While he will not be active in the Department this year, he will be on campus and will return to us in the 1983-1984 academic year.

As of the first of July it became clear that general economic problems of the country had finally arrived in Kansas. Those of you who are not currently residents of the State need to know that the governor has drastically reduced the funding in the current fiscal year. Therefore I want to take this opportunity to point out to each and every one of you who have in the past year made a contribution to the Physics and Astronomy Development Fund just how important such contributions are, especially at a time like this. During severe economic recessions, as we find ourselves in now, such contributions are not only more difficult for each and every one of us to make but they do have an important,

indeed a profound effect upon our academic programs. As you look through this annual report you will again see where contributions of our friends and alumni have helped us in preparing our programs which enhance our teaching as well as our research mission in the University and in the State. We hope to continue especially the Nobel Prize visits in the years to come and again I want to thank each and every one of you for your interest and your support in the Department and in our programs. Again, I wish to invite you as you pass through the Midwest to take a little time, stop by Lawrence and see how our Department has changed and some of the really interesting things we are now able to do. Those of you who are unable to drop by should fill out the questionnaire on the back page and send it on to me so that we can keep track of you and where you are and advise your friends and former associates here when they ask about you.

J. P. Davidson, Chairman

Ralph Krone Retires. . . .

excellent job of supervising the Department during this period of active growth.

After the loss of AEC support in 1971, Ralph devoted a greater portion of his time to teaching. A long term interest of his has been in a course for liberal arts students, who should have some knowledge and familiarity with science, but who do not have the mathematical background necessary for the regular courses. He spent much time preparing and offering a course for these people. He also prepared a version of this course for University Extension and supervised its use. Also, he taught in, and contributed to, a number of our introductory courses, mainly those involving the students who would have avoided physics in the past. For many of these courses, he developed a number of demonstration experiments.

In the last few years, he has chosen to spend the fall semester in New

Hampshire, his summer home, with wife Sally, and only return for the spring semesters. Now he has chosen to spend the full year there. We will miss both of them.

Ralph has a somewhat unusual background. He was born of American parents in Berlin in 1919. He had his early schooling in Germany, until he came to this country in 1937 to do undergraduate work at Antioch College, Yellow Springs, Ohio. He went to the University of Illinois to earn his master's degree in 1943, worked a year at NACA at Langley Field, and then went to Johns Hopkins.

He and Sally are living in Washington, New Hampshire, about 35 miles west of Concord. Their ZIP code is 03280 and their phone number is (603) 495-3429. Write, call, or drop by. I'm sure they will like to be in touch.

Frank Prosser

News from Home

Drs. Barbara Anthony-Twarog and Bruce Twarog, who were at the University of Texas, Austin, joined the Department's faculty starting in the fall 1982 semester. She does observational work in young stars while he works in older systems.

Professor Thomas P. Armstrong was an invited speaker at the Gordon Conference on Shocks in Space Plasma in Wolfboro, New Hampshire, June 19-25, 1981. Professor Armstrong attended the 17th International Cosmic Ray Conference in Paris, France, July 13-26, 1981. Professor Armstrong received a "Group Achievement Award for Voyager Science Investigations" at the Voyager awards ceremony, June 2, 1981, at the Applied Physics Laboratory.

Professors Thomas P. Armstrong and David B. Beard and Mark Paonessa (RA) attended the spring meeting of the American Geophysical Union in Baltimore, May 25-28, 1981. Mark Paonessa gave a talk entitled "Voyager Observations of Phase Space Entries of Various Species in the Magnetosphere of Saturn" (with Professor Armstrong). Professor Armstrong gave a paper entitled "Voyager Observations of Possible Ion Acceleration Near Ganymede" (with Tom Collison, B.S. 1981). Professors Armstrong and Beard and Mark Paonessa also attended a conference on the Physics of the Jovian and Saturnian Magnetospheres at the Applied Physics Laboratory, October 22-24, 1981. Professor Beard presented a paper entitled "The Saturnian Magnetic Field."

Professors Thomas P. Armstrong and David B. Beard and Scott Brandon (RA) attended the meeting of the American Geophysical Union in San Francisco, December 11-16, 1981. Professor Armstrong presented three papers: "Jovian Radiation Belt Ion Losses Within L-11" with Mark Paonessa (RA) and others; "Turbulent Magnetic Fields and Energetic Proton Bursts in the Earth's Magnetotail" with others; and "Low Energy Charged Particles (LECP)." Professor Beard and Dean Hirschi (RA) presented a paper entitled "The Saturnian Magnetosphere Field."

Professor Ronald Bass and Dr. Manfred Bucher attended the Ninth Midwest Solid State Theory Symposium at Argonne National Laboratory, November 2-3, 1981.

Professor Ronald Bass was a member of the National Research Council's Physics and Astronomy panel. The panel met in Washington, D.C., February 16-18, to review applications for NSF graduate fellowships. Professor Bass will be on sabbatical leave for the 1982-83 academic

year. He will be at the Theoretical Physics Division, AERE Harwell, Oxfordshire, England.

Professors Ronald Bass, Jack Culvahouse, Richard Sapp, Wesley P. Unruh and Gordon Wiseman, Dr. Manfred Bucher, and Eric Shank (RA) attended the meeting of the APS in Dallas, Texas, March 8-12. Professor Unruh and Eric Shank gave a paper entitled "Vacancy Diffusion and Precipitation Profiles in Undoped Sapphire."

Professor David B. Beard attended the International Magnetospheric Study Assessment Symposium at Goddard Space Flight Center, May 21-23, 1981. Professor Beard gave a colloquium entitled "The Solar Corona" at the Department of Astrophysics, Oxford University, England, June 17, 1981. He also attended the IAGA biennial meeting in Edinburgh, Scotland, August 3-14, 1981. He presented three papers entitled "Saturn's Magnetosphere," "Concise Representation of the Magnetic Field of the Jovian Equatorial Current," and "Accurate Representation of the Magnetopause Field in the Near-Earth Tail Region."

Professor David B. Beard gave a colloquium at the University of California at Los Angeles entitled "The Physics of Comets," on December 3, and a colloquium at the Aerospace Corporation on "Planetary Atmospheres," on December 4. He chaired a session on Magnetospheric Modelling at the San Francisco meeting of the American Geophysical Union, which was held December 11-16. He then travelled to Australia where he gave a sequence of colloquia: "Planetary Magnetospheres" on December 17, "Comets" on December 18 at the Physics Department of Latrobe University, Bundoora, Victoria; and "Planetary Magnetospheres" on December 23 to the Physics Department at the University of Tasmania.

Paulette and Ed Bell (RA) had a son, Nikolai Alexandre Falk, born August 27, 1981.

Professors Don Bord (adjunct), J.P. Davidson, Robert Phillips (now at Haystack), **Stephen J. Shaw**, and **Franz Heider** attended the meeting of the American Astronomical Society at the University of Colorado, Boulder, January 10-13, 1982. Professors Bord and Davidson presented a paper entitled "A Statistical Search for Medium Z Elements in the Ultraviolet Spectrum of κ Canceri." Professor Phillips presented a paper entitled "Superluminal Behaviour in BL Lacertae" (with R.L. Mutch).

Professors Don Bord, J.P. Davidson, Richard Sapp, and Gordon Wiseman, and Richard Desko (RA/TA) attended the annual meeting of the Kansas Academy of Sciences, April 23 at Kansas State University. Richard Desko presented a

paper entitled "VAX 11/750 IUE Data Reduction" while Professors Bord and Davidson presented a paper entitled "Global Search for Elements in the κ Canceri and ι Corona Borealis." Professor Bord presented a paper entitled "The Wilson-Bappu Effect: An Introductory Astronomy Laboratory Exercise," with V.M. Ogle.

Dr. Manfred Bucher has accepted a teaching position at California State University at Fresno.

Dr. Don Coppage attended a High Energy Physics Collaboration Meeting in Sofia, Bulgaria, November 1-10, 1981.

Professor J.P. Davidson attended the American Institute of Physics-Corporate Associates meeting in Washington, D.C., October 14-16, 1981. This meeting commemorated the 50th anniversary of the founding of the A.I.P. Professor Davidson visited the acoustics branch of Douglas Aircraft Company, Long Beach, California, February 3-7, 1982.

Professors Robin E.P. Davis and Nowhan Kwak attended the Crystal Ball-Argus collaboration meeting at Stanford University, December 1-5.

Professor Gisela Dreschhoff (Courtesy) gave the Centennial Lecture before the Antarctic Society in Washington, D.C., November 12, 1981. The title of her talk was "A Tale of Two Projects: Radioactivity and Solar Activity."

Professor Jacob Enoch attended the APS Plasma Physics meeting in New York City, October 12-16, 1981. He presented two papers: "Numerical Simulation of a Disk-Shaped Accelerating Electrostatic Probe" with **Joseph Nonast** (Ph.D. 1981), and "Numerical Simulation of a Conducting Disk Partially Covered by an Insulator Interacting with a Plasma" with **Rebecca Chaky** (Ph.D. 1981).

Professor Robert J. Friauf attended the Faculty Institute on the Intense Pulsed Neutron Source at Argonne National Laboratories, July 20-24, 1981, as the University of Kansas representative on the Materials Science Committee. Professor Friauf attended the 29th Midwest Solid State Conference on Novel Materials and Techniques in Condensed Matter, at Argonne National Laboratory, September 25-26, 1981.

Robert Kessel (RA/TA) attended the NATO Advanced Study Institute on Excitations in Disordered Systems at Michigan State University, East Lansing, August 23-September 4, 1981.

Professor Nowhan Kwak attended the 1981 International Symposium on Lepton and Photon Interactions at High Energies, Bonn, West Germany, August 24-29.

More News from Home on next page.

News from Home

Professor Douglas W. McKay gave a high energy seminar entitled "Considerations on Spontaneous CP Violation," at Iowa State University, September 23, 1981.

Professor Douglas W. McKay gave a colloquium at Kansas State University on February 25 entitled "Heavy Quark-Antiquark Bound States." He also gave a talk to the Physics Club entitled "Evidence for Quarks and Gluons."

Professor Herman Munczek gave a colloquium entitled "Relativistic Bound States," February 25 at the University of South Carolina, Columbia, S.C.

Professor Robert B. Phillips resigned from the Department to take a position at the Haystack Radio Telescope Observatory operated by MIT in Westford, Massachusetts.

Professor Francis W. Prosser and **Robert Racca** attended the fall meeting of the Division of Nuclear Physics of the APS at Asilomar, Pacific Grove, California, October 28-30, 1981. Professor Prosser presented a paper entitled "Fusing of $^{16}\text{O} + ^{24}\text{Mg}$ " while Bob Racca presented a paper entitled "Fusing of $^{18}\text{O} + ^{24}\text{Mg}$ and $^{16}\text{O} + ^{26}\text{Mg}$."

Professor Francis W. Prosser attended the APS spring meeting, April 26-29 in Washington, D.C. where he presented a paper entitled "Entry Line Measurements in Residues from the Fusion of $^{16}\text{O} + ^{12}\text{C}$. II (E_γ)," with **Robert Racca** (Ph.D. 1982) and others. Professor Prosser was also an author of the following papers: "Entry Line Measurements in Residues from the Fusion of $^{16}\text{O} + ^{12}\text{C}$. I (M_γ)," "Fusion, Fission and Deep-Inelastic Reaction Cross Sections for $^{32}\text{S} + ^{112}, ^{116}, ^{120}, ^{124}\text{Sn}$," and "Fusion of $^{58}\text{Ni} + ^{112}, ^{114}, ^{116}, ^{118}, ^{120}, ^{122}, ^{124}\text{Sn}$."

Bradley John Roth was awarded a National Science Foundation graduate fellowship to study biophysics.

Karen Roth (TA) (and Phil) had a 9 lb. 4 oz. baby boy at 8:58 a.m. December 16. The lad is to be known as Austin Curtis (A.K.A. Ace).

Professor Richard C. Sapp attended the 16th International Low Temperature Physics Conference at the University of California, Los Angeles, August 19-25, 1981. He also visited the facilities of the S.H.E. Corporation in San Diego.

Professors Richard C. Sapp and Gordon Wiseman, and Robert Curry (director of laboratories) attended the meeting of the Arkansas-Oklahoma-Kansas Section of the American Association of Physics Teachers at Oklahoma State University, Stillwater, October 30-31. Professor Sapp presented a paper entitled "Ground State of the Particle in a Box."

Professor Clifford Schumacher (adjunct) has accepted a position as physicist at the Electromagnetic Signature Branch of the David Taylor Naval Ship Research and Development Center in Annapolis, Maryland.

Professor Stephan J. Shawl and Jim Meyer (TA) attended International Astronomical Union Colloquium No. 68 on Star Clusters, in Schenectady, New York, October 7. Professor Shawl and Jim Meyer presented a paper with **Dr. James Hesser** (BA, 1963, Astronomy) entitled "Image-Tube Radial Velocities of Selected Globular Clusters." Professor Shawl also presented a paper entitled "The Determination of Globular Cluster Axial Ratio, Orientation and Center."

Professor Stephen J. Shawl gave a public lecture to the Kansas City Science Pioneers, February 6, at the Midwest Research Institute entitled "Is There Life Beyond the Solar System?"

Professor Stephen J. Shawl visited Drury College, Springfield, Missouri,

February 25-26, as a Harlow Shapley Lecturer for the American Astronomical Society. He presented a public lecture entitled "The Search for Life Beyond the Solar System," spoke to three classes and met with faculty and students.

Professor Robert Stump has been awarded an Intra-University Professorship for the 1982-83 academic year. He plans to obtain expertise in meteorology. He will be with the Meteorology program on campus.

Professors Gordon Wiseman and J.P. Davidson, and Chris Brungardt, Franz Heider, Gloria Manney, Jim Norcross, Earl Prather, Brad Roth, Jeff Winger, and Saeid Zoonematkermani attended the Society of Physics Students Zone 9 Conference at South Dakota State University, Brookings, November 6-7.

Professors Kai-Wai (Ken) and Jane Wong had a baby girl, January 28.

The Department's **SPS Chapter** was designated an "Outstanding SPS Chapter for 1980-81." This designation has gone to only 36 of about 500 chapters.

New Direction for High Energy Group

The high energy physics group (Professors R. Ammar, R. Davis, N. Kwak) recently received a Research Improvement Award from the University of Kansas to conduct research at the Deutsches Elektronen Synchrotron (DESY) in Hamburg, West Germany. The amount for the first year was \$36,800. It is expected that the grant will extend over three years for a total award of approximately \$96,000.

Research will be conducted using the new \$6 million state-of-the-art detector called ARGUS which is being installed at the DORIS storage ring of DESY. The DORIS storage ring contains colliding beams of electrons and positrons and the ARGUS detector will be used to study the Υ mesons produced in e^+e^- annihilations.

There are several excited states of the Υ meson. Of particular interest is the

fourth Υ state $\Upsilon(4S)$ whose mass is above threshold for the rapid decay $\Upsilon(4S) \rightarrow BB$. Each B meson thus produced contains a b-quark which is the most recently discovered quark and one about which relatively little is known. These studies should therefore provide important information on the properties of b-quarks.

The experiment is being carried out in collaboration with groups from Germany, Russia, Sweden, Canada, and the United States. The ARGUS detector is particularly well-suited to this experiment in that it is able to detect most of the particles emitted in an electron-positron reaction. Tracks of charged particles are made visible in a system of drift chambers. A magnetic field bends the trajectory of the particles thereby permitting a determination of their momenta. A set of shower counters measures the energy and identifies electrons and photons. Muons are identified as the only particles capable of traversing the iron in the return yoke of the magnet.



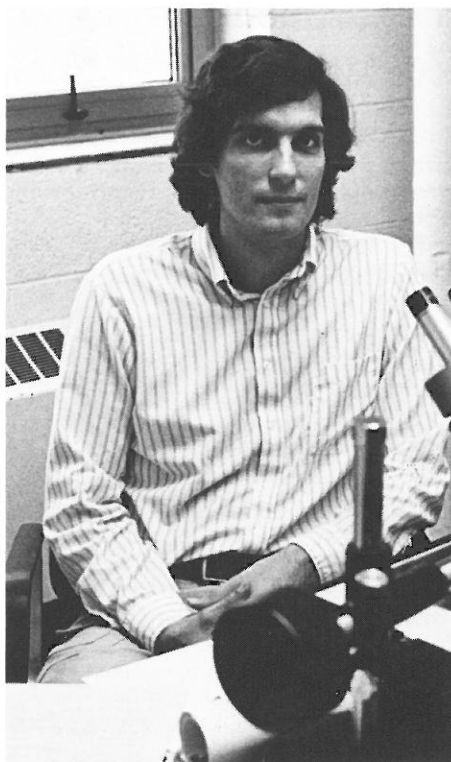
Barbara Anthony-Twarog

Two Astronomers Join the Department

Two young Ph.D. astronomers joined the Department in the fall of 1982. The two share an assistant professorship appointment equally.

Dr. Barbara Anthony-Twarog received her Ph.D. from Yale University in May of 1981. She is an observational astronomer. The work she did for her thesis was on the masses of white dwarf progenitors from U.B.V. photographic photometry in clusters of intermediate age. She comes from an instructorship at the University of Texas in Austin. She has had large telescope time on the McDonald Observatory telescopes of the University of Texas. This summer she was scheduled to observe at the Interamerican Observatory at Cero Tololo, Chile.

The other astronomer is Dr. Bruce Twarog, who obtained his Ph.D. in astronomy from Yale University in May of 1980. His Ph.D. dissertation research involved an observational study of the chemical evolution of stars in the solar neighborhood. He, too, is an observational astronomer. Dr. Twarog received



Bruce Twarog

the 1982 Trumpler award of the Astronomical Society of the Pacific. This award, which is made every two years, is for the most important Ph.D. thesis during the period under consideration. It is gratifying that the Department can attract observational astronomers of this quality to its staff. Dr. Bruce Twarog was a visiting instructor in the Department of Astronomy of the University of Texas, Austin. He, too, has had the opportunity of observational time on the telescopes at Kitt Peak and elsewhere.

The Department looks forward to this tripling in the size of its undergraduate astronomy program with much enthusiasm. We believe that the addition of two young research faculty members to our program will not only enhance our research capabilities, but will spread the teaching load of what has grown to be about a fifth of the Department's undergraduate teaching. Professor Shawl will now be able to relax somewhat in his duties as head of the Clyde W. Tombaugh Observatory as well as being the adviser for astronomy majors and instructor of all of the upper division majors courses.

Visiting Speakers

Barbara Anthony-Twarog, University of Texas, Austin: "Progenitor Masses of White Dwarfs."

Nicolaas Bloembergen, Harvard University: "Nonlinear Optics and Spectroscopy," and a public lecture, "Lasers in Science and Industry." Professor Bloembergen shared the 1981 Nobel Prize in Physics.

Glenn Conklin, Bureau of Radiological Health, Food and Drug Administration, Washington, D.C.: "FDA and the Physicist."

D. Coyne, Princeton University: "A New State of Matter."

Alex Firestone, Iowa State University, Ames: "Jet Universality; Does it make sense?"

Owen Gingerich, Harvard University and the Smithsonian Center for Astrophysics: "Was Ptolemy a Fraud?" and a public lecture, "The Galileo Affair in Modern Perspective."

J.E. Hesser (BA Astronomy 1963), Herzberg Institute of Astrophysics, Dominion Astrophysical Observatory, Victoria, British Columbia: "The Mass and Distance to Centaurus A, the Most Enigmatic (Quasi)Elliptical Galaxy."

Gerald Hoover, manager of research, Phillips Petroleum Co.: "Geophysical Applications of Physics."

Raymond H. Hughes, University of Arkansas, Fayetteville: "Laser Generated Ion Beams."

Joseph H. Macek, University of Nebraska, Lincoln: "Review of Electron Capture Reactions."

K. Milton, Oklahoma State University, Stillwater: "Current Status of Q.C.D. in Particle Physics."

Robert Mutel, University of Iowa, Iowa City: "VLBI: Past, Present, and Future."

Bruce Twarog, University of Texas, Austin: "Primary Nucleosynthesis in the Galactic Disk."

R. Watson, Kansas State University, "Pulsating Stars."

Ray White, Steward Observatory, University of Arizona, Tucson: "Small Amplitude Red Variables and Chemical Abundances in Globular Star Clusters."

Degrees Awarded

1981-82 Academic Year Ph.D. Degrees:

Patrick L. Briggs
Rebecca C. Chaky
Leland E. Herder
Joseph Nonast

Seniors Graduated:

Behnam Aghdaie, B.S., Physics
Chris L. Brungardt, B.S., Physics
Gordon Allan Burk, B.S., Engineering Physics
Robert Charles Dees, B.S., Engineering Physics
Thomas James Faddis, B.S. Engineering Physics
Gloria Lisa Manney, B.S., Engineering Physics
Earl Benjamin Prather, B.S., Engineering Physics
Gholam Ali Rezvani, B.S., Physics
John Forest Riggs, B.A., Astronomy
Bradley John Roth, B.S., Physics with Highest Distinction and Departmental Honors
Karen Celeste Roth, B.S., Engineering Physics
Roger Lee Spohn, B.S., Engineering Physics
Elizabeth Ann Simon, B.A., Astronomy
Jeff Allen Winger, B.S., Engineering Physics with Highest Distinction

General Research Fund Awards

Professor Raymond G. Ammar, Studies of Elementary Particles with New Quark Flavors, \$8,100.

Professor Thomas P. Armstrong, Numerical Simulation and Laboratory Measurements of Electrostatic Effects in Dust Accretion, \$5,200.

Professor Ronald Bass, Valence and Negative Ions in Thomas-Fermi Type Theories, \$2,000.

Professor Robert J. Friauf, Pseudopotential Calculations for Silver Atoms Embedded in Alkali- and Silver-Halide Crystals, \$4,100.

Professor Paul Goldhammer, Three Body Forces and Correlations in Light Nuclei, \$5,200.

Professor Francis W. Prosser, Analysis of Heavy-Ion Nuclear Physics Data, \$2,000.

Professor Stephen J. Shawl, A Search for Close Companions to Long-period Variable Stars, \$2,900.

Professor Wesley P. Unruh, Numerical Simulation and Laboratory Measurements of Electrostatic Effects in Dust Accretion, \$4,100.

Departmental Awards

Outstanding Senior in Physics and Astronomy 1982:

Bradley John Roth

Outstanding Senior in Engineering Physics 1982:

Jeff Allen Winger

Outstanding Woman Student in Physics and Astronomy 1982:

Cindy Neyer

Outstanding Teaching Assistants 1982:

Richard Desko

Brad Roth

Saeid Zoonematkermani

Outside Funding

Professors Raymond G. Ammar, Robin E.P. Davis, and Nowhan Kwak, Elementary Particles at High Energies (NSF), \$131,000.

Professor Thomas P. Armstrong, Jupiter Data Analysis (Applied Physics Laboratory-Johns Hopkins), \$20,700.

Professor Thomas P. Armstrong, Studies of Solar and Magnetospheric Particles (APL-Johns Hopkins), \$44,000.

Professor Thomas P. Armstrong, Voyager Mission Operations (Applied Physics Laboratory), \$15,000.

Professor Thomas P. Armstrong, Voyager Mission Data Analysis (Applied Physics Laboratory), \$18,000.

Professor Thomas P. Armstrong, Project Galileo (NOAA), \$7,100.

Professors Thomas P. Armstrong and David B. Beard, Numerical and Observational Study of Charged Particle Motions in the Mid- and Inner Jovian Magnetosphere, \$30,000.

Professor David B. Beard, To Model the Magnetic Field of Jupiter (NASA), \$20,000.

Professor J.P. Davidson, Junior Science and Humanities Symposium (Academy of Applied Sciences), \$9,800.

Professors Jack Enoch and Thomas P. Armstrong, Self-Consistent Numerical Simulation of Plasma-Insulator Interactions in Space (NASA), \$69,000.

Professors Herman Munczek and Douglas W. McKay, Gauge Model Study of CP and Parity Violation: Question of Right Handed Coupling and Hadron Stability (Department of Energy), \$17,000.

Professor Robert B. Phillips, Evolution of BL Lacertae Following the 1980 Radio Outburst (AAS small grant), \$800.

Professor Frank Prosser, Fusion Measurements in Light and Medium Mass Heavy-Ion Reactions (Department of Energy), \$55,100.

Students with the new 14-inch Celestron telescope.



Faculty Publications

Professor Beard, "Comment on 'The Closed Model of the Earth's Magnetosphere' by J.H. Paddington," J. Geophys. Res. 86, 2490 (1981); "Cometary Tails," Ap. J. 245, 743 (1981).

Professor Enoch with **Drs. Chaky** (Ph.D. '81) and **Nonast** (Ph.D. '81), "Numerical Simulation of Sheath Structure and Current-Voltage Characteristics of a Conductor-Dielectric Disk in a Plasma," J. App. Phys. 52, 7092 (1981).

Professor Goldhammer, "Separation of Nuclear Forces and Perturbation Theory," Phys. Rev. C23, 2700 (1981).

Professor Munczek, "Composite Boson Fields from Local and Nonlocal Fermionic Lagrangian," Phys. Rev. D25, 1579 (1982).

Professor Phillips, "Millisecond Structure of BL Lac Pacing Outburst," Nature 294, 236 (1981); "The Structure of DA 344 at 1.67GHz," Astronomical J., 86, 1600 (1981), both with others; "Rapid Expansion of BL Lacertae," Ap. J. 257, June 1 (1982), with R.L. Matel.

Professor Prosser, Am. J. Phys. 49, 1001 (1981), letters to the editor.

Professor Shawl, "Polarization of Scattered Light in Globular Clusters," Ap. J. 251, 108 (1981), with P.G. Martin.

Professor Wiseman's obituary of Professor James D. Stranathan, Physics Today, October, p. 119 (1981).

Professor Yarger (Courtesy), "Aeromagnetic Survey of Kansas," EOS, 62, 173 (1981).

News from Alumni

Edwin Barker (MS Astronomy 1964), **Humberto Campins** (BA Astronomy 1977), and **David Tholen** (BA Physics and Astronomy 1978) presented several papers at the 13th annual meeting of the Division of Planetary Sciences of the A.A.S. at Pittsburgh, October 13-16, 1981. Dr. Barker is at the University of Texas, Austin, while Campins and Tholen are graduate students at the University of Arizona.

Robert N. Barnett (PhD 1980) presented two papers at the Dallas meeting of the APS, March 8-12, 1982. They were entitled "Perfect Formation Energies Near Simple Metal Surfaces," and "Dynamics of Phase Transformations in a Binary Mixture." He is currently a post-doc at Georgia Tech in Atlanta.

Bruce Richard Barrett (BS Physics 1961) is a full professor and the associate departmental chairman at the Department of Physics, Bldg. 81, University of Arizona, Tucson, 85721. His home address is 628 N. Norris Ave., Tucson, 85719. His area of research is nuclear structure theory and he is interested in the boson model of nuclear structure. He has recently published a major review article on this topic in Revista Mexicana de Fisica 27 8, (1981). He has been invited to participate in a research program in nuclear many-body theory this fall at the Institute for Theoretical Physics at the University of California, Santa Barbara.

Lee Britt (MS 1978) is working for Systems Research Laboratories in Dayton, Ohio. His address is 1686 D, Beaver Ridge Dr., Kettering, Ohio, 45429.

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Tom Collison (BS Physics 1981) is at the Applied Physics Laboratory of Johns Hopkins University.

Hassan Ghafoori-farad (PhD 1977) is currently Energy Minister of Iran.

R.L. Gilliland (BA Astronomy 1979) gave a paper at the AAS meeting in Boulder, Colorado, January 10-13, 1982, entitled "ExHydrae: Spectroscopic and Photometric Variations." He is now at the High Altitude Laboratory (NACR), Boulder.

Bret Goodrich is working as a large telescope operator at Kitt Peak National Observatory. His address is Box 220, Sells Star Route, Tucson, Arizona, 85735.

Dean Halderson (PhD 1974) recently published "Width of the 6-T=1, $E_x=14.36$ MeV State in ^{28}Si and Its Relationship to Intermediate Energy Inelastic Scattering," Phys. Rev. C24, 786 (1981), and "Pion Inelastic Scattering to Particle Unbound Stretched States of ^{12}C ," Phys. Rev. C24, 1095 (1981). He has moved to the Department of Physics, Western Michigan University, Kalamazoo, 49008.

Phillip Hornung (BS 1972) has completed his PhD at Iowa State and is currently a Research Scientist, Corporate Instrument Research, at Varian, 611 Hansen Way, P.O. Box 10800, Palo Alto, California, 94303.

Steve Little (BA 1961, MA 1963 in Astronomy) gave a special colloquium at KU, August 31, 1981, on "Technetium Stars." He is at the Department of Astronomy, Wellesley College, Wellesley, Massachusetts.

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