

The American Physical Society

The Division of Astrophysics

February 1996

No. 85 NEWSLETTER

1995-1996 OFFICERS

The officers of Division of Astrophysics (DAP) Executive Committee are:

Claude R. Canizares, MIT, Chair.

Wick Haxton, U. Washington, Chair-Elect and Chair of 1996 Meeting Program Committee.

Richard E. Lingenfelter, Center for Astrophysics, UC-San Diego, Vice-Chair.

Four Members-at-large:

Joan M. Centrella, Drexel University

Steven M. Kahn - UC, Berkeley

Leon Golub SAO + Harvard

C. Megan Urry Space Telescope Science Institute

Fred Seward, Harvard, past-Chair

Frank Jones - NASA-GSFC, Division Councillor

Irene Engle, USNA, Secretary-Treasurer

APS MEETING, 2-5 MAY, 1996

The annual meeting of the Division of Astrophysics will be at the joint APS-AAPT General Meeting 2-5 May, 1996 in Indianapolis, IN. **Wick Haxton** is the 1996 Program Committee Chair for DAP. Following is a list of session titles, speakers, and chairs:

Thursday, 2 May

Topics in Particle Astrophysics - Joint session with Div. of Particles and Fields

Chair: Angela Olinto, U. Chicago

"Cosmic Ray Studies of Antimatter" Greg Tarle, U. Michigan

"Constraints from CP Violation on Electro-weak Baryogenesis"

Patrick Huet, U. Washington

"Searches for Axions"

Pierre Sikivie, Florida

"Prospects for Searches for Gravitational Waves"

Barry Barish, Caltech

"Impact of Accelerator Experiments on the Dark Matter Problem"

Kim Griest, UC San Diego

Interstellar Medium, Stars and Planetary Physics

Contributed papers session-- 8:00 am

Cosmic Rays: Antiparticle Measurements/ General Theory

Contributed papers session-- 11:00 am

Formation and Evolution of Galaxies

Chair: David Schramm, U. Chicago

"Studies of Galaxy Evolution with the Hubble Space Telescope"

Simon Lilly, U. Toronto

"Primeval Galaxies and QSO Absorbers" Len Cowie, Hawaii

"The Cosmic Lives of Galaxies: Birth, Cannibalism, Merging, and Harassment"

George Lake, Washington

"The Evolution of Galaxies in Different Environments"

Jacqueline van Gorkom, Columbia

A **Special Session** has been arranged to immediately follow the preceding program in the same room.

Chair: Bob Schrieffer

Speaker: Dan Goldin, NASA

Neutron Stars - Joint session with the Gravitation Topical Group

Chair: Cliff Will, Washington Univ.

"Neutron Star Models and Gamma Ray Bursts"

Peter Mazaros, Penn State

"Neutron Star Binary Coalescence"

Dong Lai, Caltech

"General Relativistic Instabilities of Neutron Stars"

John Friedman, U. Wisc./Milw.

"Observations of Gamma Ray Bursts" Charles Meegan, Marshall SFC

The Annual Business Meeting

of the Division of Astrophysics will be held in the same room immediately after the close of the session. New DAP Fellows of APS will be honored. Please Join us.

Graduate Students' Reception: 1800 2 May

Tri-Divisional Colloquia on

Nuclear and Particle Astrophysics

(special evening session)

Sponsored by the Divisions of Astrophysics, Nuclear Physics, and Particles and Fields

Chair: Wick Haxton, U. Washington

"Shadows of Creation: The Dark Matter of the Universe"

David Schramm, Chicago

"The Problem of the Missing Solar Neutrinos"

Hamish Robertson, Washington

"Imaging the Early Universe"

Paul Steinhardt, U. Pennsylvania

The Tri-Divisional Colloquia talks will be presented in the style and at the level of typical department colloquia.

Friday, 3 May

Big Bang Cosmology

Chair: Claude Canizares, MIT

"Measuring the Hubble Constant with the Hubble Space Telescope"

Wendy Freedman, Carnegie Obs.

"The Hubble Constant from Stellar Ages" Don Vandenberg, Victoria

"Anomalous Streaming Velocities on Large Scales"

Tod Lauer, KPNO

"Abundances of Primordial Elements" Robert Kennicutt, Arizona

The Physics of Novae & Supernovae

Joint session w. Div. of Nuclear Physics,

Chair: Art Champagne, U. North Carolina

"Supernovae as Cosmic Yardsticks" Robert Kirshner, Harvard

"The Type II Supernova Mechanism" Steve Bruenn, Florida Atlantic

"The Physics of Nova Explosions" Sumner Starrfield, Arizona State U.

"Trigger Reactions and the Endpoints of the rp Process: Experiments with Radioactive Beams"

Michael Wiescher, Notre Dame

Galaxies/Cosmology

Contributed papers' session - 11:00 am

Plasma Astrophysics

(Jointly w. the Div. of Plasma Physics,)

Chair: Toshi Tajima, U. Texas

"The Origin of Cosmological Magnetic Fields"

Russell Kulsrud, Princeton

"Magnetic Viscosity Due to Shearing Instabilities in Disks"

Ryoji Matsumoto, Chiba

"On the Earth's Dynamo"

Gary Glatzmaier, Los Alamos

"Experimental Astrophysics Using Intense Lasers"

E. M. Campbell, Lawrence Livermore

W. A. Fowler Memorial Session

(Organized by the DAP & DNP for the APS)

Chair : Bob Wagoner, Stanford

"Laboratory Astrophysics "

Charlie Barnes, Caltech

"Solar Neutrinos"

John Bahcall, Inst. f. Advanced Study

"Supernovae and Nucleosynthesis" Stan Woosley, UC Santa Cruz

"New Developments in Primordial Nucleosynthesis"

George Fuller, UCSD

Saturday, 4 May

Magnetic Fields in Astrophysics

(Cosponsored by the American Astronomical Society)

Chair: Leon Golub, Harvard

"Magnetic Collimation of Jet Outflows from Protostars, X-ray Binaries, and Quasars"

Roger Blandford, Caltech

"Solar Magnetic Fields"

Bob Rosner, Chicago

"The Role of Magnetic Fields in Star Formation"

Telemachos Mouschovias, Illinois

"Magnetic Fields of Neutron Stars "

Shrinivas Kulkarni, Caltech

Magnetic Fields in Astrophysics

Focus Session- 11:00 am

Cosmic Ray Composition

Contributed papers' session - 11:00 am

Observational Cosmology

Chair: George Fuller, UC San Diego

"The Low Surface Brightness Clues to Structure Formation"

Julianne Dalcanton, Princeton

"The Small Angle Cosmic Background" Martin White, Chicago

"Radiation Anisotropies: The Las Campanas Redshift Survey "

Huan Lin, Toronto

"Early Boron and Beryllium "

Douglas Duncan, Chicago

Modern Methods in Astronomy Education

(Sponsored by the Area Committee on Astronomy Education, cohosted by the DAP)

Saturday afternoon, 4 May

"Simulations in Astronomy and Astrophysics"

Richard Kouzes, West Virginia

"Undergraduate Research in Astronomy " James Higdon, Claremont Colleges

"Pedagogical Devices in the Introductory Astronomy Course"

Walter Biscard, Central Michigan

Sunday, 5 May

Cosmic Rays:

High Energy Measurements, gamma rays, neutrinos and new particles.

Contributed papers session - 11:00 am

NEW DAP OF APS FELLOWS

The following distinguished colleagues were recently elected as Fellows of the American Physical Society. Their Certificates of Fellowship will be presented during the Business Meeting of the Division of Astrophysics.

Gerald J. Fishman

"For pioneering advances in gamma-ray astronomy, particularly his important observations of gamma-ray bursts that suggest a possible cosmological origin."

Margaret J. Geller

"For her pioneering contributions to mapping the nearby universe and elucidating the large-scale structure in the distribution of galaxies."

James Conway Higdon

"For his important work on interplanetary and interstellar turbulence and his innovative studies of gamma ray bursts, cosmic rays, pulsars, novae, supernovae, and galactic nucleosynthesis."

Richard Alfred Matzner

"For his analyses in general relativity of a wide range of astrophysical phenomena, especially his numerical simulations of strong-field gravitational systems and the gravitational radiation they produce."

Samuel Harvey Moseley, Jr.

"For his contributions to instrumentation in astrophysics, especially his conception and development of the X-ray microcalorimeter and his studies of the SN1987A fine structure lines of iron with long-wavelength infrared detectors."

Richard Eiseman Rothschild

"For his seminal work in determining the spectra and time variations of cosmic X-ray sources, and for his innovative development of instrumentation for these studies."

Joseph I. Silk

"For his pioneering role in understanding the cosmic microwave background radiation and the formation of large-scale structure in the universe, and in recognition of the bridges he helped establish between particle and nuclear physics and cosmology."

Thomas A. Weaver

"For his crucial contributions to our understanding of massive stars and their evolution, supernovae, and the

origin of the chemical elements."

NOMINATIONS for FELLOWSHIP

Each year the Astrophysics Division may nominate 6-7 APS members for fellowship. Nominations are due before April 30, 1996. These can be sent to the 1996 Chair of the DAP Fellowship Committee, **Richard Lingenfelter**, or directly to the APS. The required form is obtainable from **Richard Lingenfelter** or directly from APS. It does take some time to collect the information required. Please give some thought to appropriate nominations and pass on your suggestions to the nominating committee.

Division of Astrophysics

1996 Election of Officers

The members of the 1995-96 Committee are:

Alice Harding- NASA-GSFC

John P. Hughes-Harvard Smithsonian Center for Astrophysics

Frank Jones - NASA-GSFC

The nominating committee has arrived at the following slate of candidates: Please take a moment to **VOTE** for **one** Vice-Chair, **one** Secretary-Treasurer, and **two** Members-at-Large on the enclosed ballot and place it into the mail.

For **Vice Chair**:

Thomas K. Gaisser received his Ph.D. from Brown in 1967. He has been on the faculty of the Bartol Research Institute since 1970. He is currently vice-president of Commission 4 (Cosmic Radiation) of the International Union of Pure and Applied Physics, receiving editor for the journal *Astroparticle Physics* and a member of the Science Council of the Universities Space Research Association. He recently chaired the NAS/NRC Committee on Cosmic Ray Physics. His research interests are cosmic ray physics and its relation to astrophysics and particle physics.

CANDIDATE'S STATEMENT: I believe the primary task of the officers of the Division is to organize an attractive program of invited talks for the Spring Meeting of the American Physical Society on topics of current interest in astrophysics. I would continue the emphasis of the past few years on interdisciplinary talks that take advantage of the connections among astrophysics, nuclear physics and particle physics. The public relations possible with a program of talks on important, interdisciplinary scientific topics can be an effective means of promoting public notice of new developments in astrophysics, which is essential for maintaining public support of the field. I would also want to explore ways for the Division to use its influence to obtain travel grants for young scientists to attend major meetings of interest for the Division of Astrophysics.

For **Vice Chair**:

Josh Grindlay, Harvard University

Jonathan E. Grindlay ("Josh") received his B.A. in Physics from Dartmouth in 1966 and Ph.D. in astrophysics from Harvard in 1971. He was a Junior Fellow at Harvard (1971-74), staff scientist at SAO (1974-76) before joining the Harvard faculty as Assistant Professor of Astronomy (1976) and then Professor of Astronomy (1981-). He served as Chair of the Department of Astronomy (1985-90) and has been a Sloan Fellow (1979) and Guggenheim Fellow (1993). He is a Fellow of both the APS and the AAAS and has served on (as well as chaired) numerous national committees for (primarily) NASA. He is currently a Vice President of the AAS.

J. Grindlay is active in a wide range of investigations in high energy astrophysics. His primary interests in recent years have been on the nature and origin of compact x-ray binaries in dense star clusters which he has pursued with ROSAT and HST; on the nature and number of black hole vs. neutron star x-ray binaries in the Galaxy which he has pursued with BATSE on CGRO; and the development of hard x-ray imaging telescopes for balloon-borne and future satellite missions.

CANDIDATE'S STATEMENT: As a candidate for Vice Chair of the DAP, I would strive to achieve the following goals for our Division over the next 3 years: 1) increase participation at the Spring Meeting. The superb program put together for the coming May meeting in Indianapolis should be springboard for more to come (hopefully not in conflict with the AAS/HEAD meeting !) which can both build on links with other Divisions (e.g. DPF and DNP) and the excitement of new experiments, models, and missions (e.g. XTE, just launched); 2) increase membership in DAP. Our division still does not reflect the prominent place that astrophysics has come to play in physics today. By increasing our membership among APS members, we can build more and better links to the physics community at large, which can only help our students as they seek jobs and us as we seek new insights in our increasingly inter-disciplinary field; 3) increase public outreach. Much is said about the need to communicate with the public who support us, but more could be done. Other societies (e.g. the AAS) have mounted (or are mounting) major education efforts. The DAP should consider what it can do to facilitate greater participation in primary and secondary school science (and not just for our own kids !) by means such as talks or science fair mentoring and judging; and 4) increase political participation and awareness of our members. While we may rather do science, it is vital to educate not only the public but our Congressional representatives as well about why our work is worthy of public support. With all the good press coverage of exciting new results in astrophysics from space (e.g. HST) and the ground (e.g. Keck), the members and staffers are now well primed but they are surprised not to hear from us directly. DAP could play a larger role in calling its membership to action. As an astrophysicist with broad (gamma-ray to optical) interests and experience with many of the issues listed above, I would be keen to put these to use for DAP.

FOR Secretary-Treasurer

Patricia T. Boyd, Research Scientist, Universities Space Research Association, and Laboratory for High Energy Astrophysics, NASA Goddard Space Flight Center

Research Interests: nonperiodic variations in astrophysical systems, x-ray binaries, three-body stellar dynamics, computational astrophysics

CANDIDATE'S STATEMENT: Presently, the amount of available observational data, particularly that obtained with orbiting instruments, is growing at a rapid pace. I envision the Division of Astrophysics as an organization that, among other things, fosters the participation of physicists in the analysis and pace. I envision the Division of Astrophysics as an organization that, among other things, fosters the participation of physicists in the analysis and interpretation of these state-of-the-art observations. If elected to the position of Secretary/Treasurer I intend to facilitate the introduction of interested physicists to the many data archives

that exist, a connection that should benefit everyone.

For **Secretary-Treasurer**:

Stephen P. Reynolds, Professor of Physics, North Carolina State University

RESEARCH INTERESTS: High-energy astrophysics: supernova remnants, shock waves, particle acceleration.

CANDIDATE'S STATEMENT: The position of Secretary/Treasurer of the Astrophysics Division is more an administrative than a policy-making one, and if elected I pledge to perform those administrative functions reliably as described in the Division Bylaws. To the extent that I am part of policy discussions, I favor improving communication with related organizations, principally the High-Energy Astrophysics Division (HEAD) of the American Astronomical Society. (In the future, we should be able to prevent unfortunate conflicts such as that between this Spring's HEAD meeting and the APS/AAPT meeting). Communication with and among Division members can also be improved principally by moving to electronic communication wherever possible, and I propose to distribute the Newsletter electronically as much as possible. In general, I favor improving ties with colleagues in other areas of physics, through mechanisms such as inter-divisional sessions at APS meetings, and in whatever other ways seem appropriate. As resources become scarce, we should all re-emphasize the unity of physics as well as the vitality of our sub-discipline.

Four candidates for **Member-at Large**

Charles D. Dermer - Head of the High Energy Astrophysics Theory Section in the Space Science Division at the Naval Research Laboratory, Washington, DC

RESEARCH INTERESTS: High energy astrophysics and gamma-ray astronomy; multiwavelength astronomy of blazars, gamma-ray bursts, compact objects, cosmic rays

RELATED EXPERIENCE: Executive Committee Member, High Energy Astrophysics Division of the American Astronomical Society; numerous NASA proposal review committees

CANDIDATE'S STATEMENT: The good news I see coming from a flat science budget is the maturing awareness that talent, ambition, and a PhD do not guarantee anyone a life in science, and that we as a community cannot remain insular. We must convince our colleagues and the American people that our work has lasting use. Fortunately, the case is easily made for astronomy. Besides providing astonishing images, our science has been historically beneficial and remains so today (e.g., precision timing; navigation; remote sensing). Unfortunately, we have not been sufficiently aggressive in promoting the importance of astronomy.

As an executive committee member in the Division of Astrophysics of the APS, I will take on the responsibility for maintaining high standards at the divisional meetings, furthering interactions between the physics and astronomy communities and with the general public, and pursuing a coordinated strategy for increased astronomy funding.

Donald C. Ellison, Associate Professor of Physics, Physics Department, North Carolina State University, Raleigh, NC

RESEARCH INTERESTS: Cosmic ray physics, space plasma physics and numerical simulations, particle

acceleration in shocks

CANDIDATE STATEMENT: The areas I would like to concentrate on if elected to the Executive Committee are:

(1) Promoting a series of small, directed workshops on timely topics where researchers will have the opportunity to discuss problems in depth. Such workshops can be particularly valuable if a strong effort is made to have observers and theorists talk to each other with particular problems in mind. (2) Working to establish additional prizes and awards for astrophysics, both as a way of rewarding worthy efforts and to increase the visibility of astrophysics in general. I feel awards can be an extremely cost effective way to enhance and publicize our discipline. (3) Doing whatever is possible to ensure that science in general, and astrophysics in particular, is looked upon by our bright young people in secondary schools as a desirable path for employment and success. The lack of permanent positions, for even exceptionally qualified people, that is now plaguing us is causing the best of our young people to choose fields outside science. Unless something can be done to reverse this, science in the US will clearly suffer in the long run.

John Huchra, b 13/23/1948. Professor of Astronomy, Harvard-Smithsonian Center for Astrophysics, Associate Director for Optical and Infrared Astronomy, Director of the F. L. Whipple Observatory. S.B. M.I.T. 1970, Ph.D. Caltech, 1977. Member of the National Academy of Science and American Academy of Arts and Sciences. Fellow of the APS and the AAAS.

RESEARCH INTERESTS: observational cosmology, galaxy clusters, active galactic nuclei and stellar populations.

CANDIDATE'S STATEMENT: The research community today is facing a set of challenges like never before. Funding for the physical sciences may be especially hard hit because of links to defense technology. At the same time, public science literacy appears to be declining. Astrophysics and astronomy offer wonderful conduits for both educational activities and public relations. I believe that the scientific community must make even greater efforts to tell the public what we are doing, how we are doing it and, most importantly, why we engage in basic research.

In the APS, Astrophysics has primarily been the venue of high energy astronomers, with a few, primarily theoretical cosmologists thrown in. Today, most "astronomers" are really astrophysicists with strong physics backgrounds. I believe it is important for the Division to broaden its horizons and voice in the physics community. thus give astrophysics a greater voice in the physics community.

W. Vernon Jones

Chief Scientist
Space Physics Division
Office of Space Science
Code SS
NASA Headquarters
Washington, DC 20546

With the currently ongoing reorganization of NASA Headquarters, Dr. Jones is in transition from Chief Scientist, Space Physics Division to Senior Science Program Executive/Suborbital. Since the inception of NASA's Space Physics Division in 1987, he has served as the senior focal point for all Office of Space Science activities bearing directly upon the scientific content of the Cosmic and Heliospheric Physics disciplines. In the new organization he has, in addition, key responsibility for scientific utilization of NASA's research rockets and

balloons, including developing and continuously updating their scientific goals and objectives, their policies and plans, and their flight missions. He is charged with managing these suborbital programs to address, within available resources, science questions across all science themes and disciplines comprising the Office of Space Science. He maintains personal involvement in high energy particle astrophysics research as Professor Emeritus at Louisiana State University. He looks forward, if elected, to further service to the scientific community as DAP Executive Committee Member.

PLEASE SIGN AND CLEARLY PRINT YOUR NAME ON THE BALLOT.

Votes without name and signature cannot be counted. Please send your vote to the Secretary-Treasurer, Irene Engle.

Deadline for receipt of ballots is:

April 15 1996.

Results will be announced at the annual business meeting 2 May, 1996.

BETHE PRIZE

The DAP has joined with the Division of Nuclear Physics in an effort to create a new APS prize in honor of Hans Bethe. Hans is a long-time member of both Divisions. Our goal is to raise the necessary \$100,000, the level required to keep the prize self-sustaining, prior to Hans's 90th birthday, July 2, 1996. The prize is intended to reflect the breadth of Hans's interests, and will be awarded for outstanding work in either of these fields. The Divisions will work together in selecting the recipients, with the role of "lead Division" alternating.

Contributions for laboratories, industry, and more than 250 individuals now total approximately \$60,000. If you have not yet contributed, please consider doing so now. Tax-deductible contributions (APS-Bethe Prize Fund) can be mailed in care of the DAP Secretary/Treasurer Irene Engle. We hope that the broad support this effort has already received from our community will continue, as this will give the prize more meaning. Thank you for your help.

GRADUATE STUDENT REGISTRATION "FELLOWSHIPS"

FOR APRIL '95 MEETING

To encourage the attendance of students, the APS & DAP will again pay the registration fee for a number of otherwise unsupported graduate students. The registration fee for graduate student APS members has been \$40 and the comparable fee for non-members has been \$325 (for the full meeting). Undergraduates may attend free. As it is cheaper to join the APS and register than to register as a non-member, the offer is a free one year's membership in the APS and DAP and a paid registration fee at the prevailing rate. Application should be made in advance to the DAP Secretary, Irene Engle, via email (preferred) or to her mail address.

engle @charleston.nadn.navy.mil

LA JOLLA SPRING SCHOOL 1996 ASTROPHYSICS

The **LA JOLLA SPRING SCHOOL IN ASTROPHYSICS** will convene March 25-29, 1996 in La Jolla, CA.

For further information, please contact ASAP:

La Jolla International School of Physics
The Institute for Advanced Physics Studies
P. O. Box 2946, La Jolla, CA 92038
Telephone: (619) 456-456-5737
FAX: (619) 454-267

Future Newsletters

It is anticipated that there will be a newsletter composed and sent in Fall of 1996. Items of interest to our DAP members which would be then timely would, I am sure, be gleefully and gratefully received. If in doubt about where to send items, please contact me for the direction of the new Secretary-Treasurer, or simply send them along for me to forward to the person relieving me. My best wishes to all DAP members are conveyed in this, the final newsletter composed by me.

Respectfully conveyed,

Irene M. Engle
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