

DPB March 1999 Newsletter

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Secretary-Treasurer Bids Farewell **Questions? Comments?**

Contact the Secretary-Treasurer:

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Upton, NY 11973

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Election Results for the 1999 DPB Executive Committee

The election for the 1999 Division of Physics of Beams (DPB) Executive Committee has been completed. There were a total of 386 votes cast corresponding to 31% of the membership (1240 as of December 31, 1998). The winners are: Ronald Davidson for Vice-Chair; Ilan Ben-Zvi for Secretary-Treasurer; and Patrick Colestock and Ronald Ruth for Members-at-Large (3 years). The membership of the 1999 DPB Executive Committee will therefore be:

Chair

John Peoples (4/00)

Chair-Elect

Alexander Chao (4/00)

Vice-Chair

Ronald Davidson (4/00)

Divisional Councilor

Robert Siemann (12/01)

Secretary-Treasurer

Ilan Ben-Zvi (4/02)

Past Chair

William Herrmannsfeldt (4/00)

Members-at-Large

Swapam Chattopadhyay (4/00)

Patrick Colestock (4/02)

Alex J. Dragt (4/00)

Gerald Jackson (5/01)

Shyh-Yuan Lee (5/01)

Ronald Ruth (4/02)

Ex-Officio Members

Wu-Tsung Weng, PAC99 Chair (12/99)

Yanlai Cho, PAC01 Chair (12/01)

David Finley, PAC01 Program Chair (12/01)

Matthew Allen, NPSS/IEEE Rep (12/01)

Each term of office, except for the office of Divisional Councilor and the Ex-officio members, begins in April 1999 on the last day of the Division's Regular Meeting and ends in April/May of the year indicated on the last day of the Division's Regular Meeting. The Chair-Elect will become Chair and the Vice-Chair will become Chair-Elect in the following year.

Membership: 1999 DPB Committees and DPB-Related Committees**Executive Committee (4/99 - 4/00):**

(see "Election Results" section)

Nominating Committee (4/99 - 4/00):

Chao (chair), Alessi, Alonso (Bylaws rep), Ben-Zvi, Celata (APS rep), Davidson, Flanz, Freund, Leemans, Ryne, Siemann, York

Fellowship Committee (4/99 - 4/00):

Davidson (chair), Cary, Granatstein, Harrison, Tajima, Tang, P. Wilson

Publications Committee (4/99 - 4/00):

Wurtele (chair), Schoessow (v-chair), Bisognano (PRE Board of Ed), Temkin (PRE Board of Ed), K.J. Kim (PRL Div. Assoc. Ed), Chattopadhyay

Education Committee (4/99 - 4/00):

Minty (chair), Olsen, O'Shea, Padamsee, Rubin, Wurtele

Wilson Prize Committee (4/99 - 4/00, for 2000 prize):

Briggs (chair), G. Dugan (v-chair), Joshi, Ruth, Sands (pw)

Doctoral Research Award Committee (4/99 - 4/00, for 2000 award):

T. Smith (chair), Talman (v-chair), Berz, Leemans, C.M. Tang, Conti (aw)

Program Committee (for 2000 DPB Annual Meeting):

Chao (chair), Davidson (v-chair), approximately 25 members to be selected.

PAC99 Organizing Committee (12/97 - 12/99):

Weng (chair), Allen, Ball, Barletta, Ben-Zvi, Cho, Costrell, Craddock, Dawson, Finley, Friesel, Hartill, Joshi, Kihara, Krinsky, Leemann, Peoples, Reiser, Ripin, Roberson, Schriber, Siemann, Sutter, Tazzari, Westenskow, York

PAC99 Program Committee (12/97 - 12/99):

Ben-Zvi (chair), Alonso, Balakin, Barletta, Berz, Bisognano, Blackmore, Byrd, Caporaso, Carlsten, Cary, Chattopdhyay, Cho, Collins, Corlett, Craddock, Debenham, Decker, Dutto, Esarey, Finley, Fox, Galayda, Gallardo, Gilpatrick, Gluskin, Gourlay, Hahn, Hamm, Herrmannsfeldt, Holt, Hutton, Jackson, Jason, Katsouleas, Kneisel, Krafft, Krinsky, Krisch, Laclare, Lee, Leemans, Lynch, Marti, McAshan, McDowell, McGinnis, Month, Myers, Namkung, Nolen, Noonan, Olsen, Oren, O'Shea, Padamsee, Peggs, Pellegrini, Peoples, Phinney, Raubenheimer, Reiser, Rogers, Rosenzweig, Roser, Rubin, Ryne, Schriber, Sheffield, Siemann, Sutter, Todd, Tompkins, Thuot, Vignola, Wanderer, Wang, Weng, White, Whittum, Willike, Wilson, Yamazaki, Yan, Zolfaghari, Zumbro

PAC99: 1999 Particle Accelerator Conference

1999 Particle Accelerator Conference -
New York City

March 29 - April 2, 1999

Conference Chair - W.T. Weng (weng@bnl.gov)

Program Chair - Ilan Ben-Zvi (ilan@bnl.gov)

Conference Secretary - Mary Campbell (maryc@bnl.gov)

The 1999 Particle Accelerator Conference - the 18th in this series - organized by Brookhaven National Laboratory, will be held at the Marriott Marquis Hotel in New York City. Detailed up-to-date information on PAC99 is available at <http://pac99.bnl.gov>.

The conference covers new developments in all aspects of the science, technology, and use of accelerators. It also provides a channel of communication for accelerator scientists and engineers and persons concerned with the applications of accelerators. The program, as usual, includes invited talks and both oral and poster contributed papers. Of the almost 1550 papers submitted to the conference, 76 are invited papers, 123 are oral contributed and 1350 are posters. There were 1103 pre-registrants as of mid-February, with an estimated attendance of 1300.

The PAC is a representation of a rich field forever changing and growing. Combining engineering and physics in ingenious ways, the field fosters the emergence of new methods and new technologies so as to satisfy and stimulate the forward march of frontier science, medicine, industry and defense.

The PAC organization has been formally linked to the DPB via the May 1993 MOU. But more importantly, the two groups have a strong common interest to help better the accelerator community, both science and engineering components. When we became a division in 1990, we invited the PAC Chair, the PAC Program Chair and the IEEE/NPSS representative to be ex-officio members of the DPB Executive Committee. Through this arrangement, our meetings have become an opportunity to plan joint efforts and to work through any misunderstandings that arise. With a quid pro quo for DPB/APS membership on the PAC Organizing Committee, we have shown how well we can work together. After all, we are one community and working for its betterment and for the good of future generations are duties we must not shirk!

The conference is jointly sponsored by the Institute of Electrical and Electronic Engineers (IEEE) through its Nuclear and Plasma Sciences Society (NPSS), and by the American Physical Society (APS) through its Division of Physics of Beams(DPB).

Prize Winners in Beam Physics and Accelerator Technology Announced

1999 APS Robert R. Wilson Prize to Recognize and Encourage Outstanding Achievement in the Physics of Particle Accelerators.

A prize of the American Physical Society sponsored by the APS Division of Physics of Beams, the APS Division of Particles and Fields and the Friends of R.R. Wilson. This year, the winner is:

Robert B. Palmer,

"for his many diverse contributions and innovations in particle accelerator and detector technologies, including superconducting magnets, longitudinal stochastic cooling, bubble chambers and neutrino beam lines, crab crossing in lepton colliders, laser acceleration, and for recent leadership of the muon collider concept." Prize Committee Chair: Hermann Grunder

1999 APS Award for Outstanding Doctoral Thesis Research in Beam Physics.

An award of the American Physical Society sponsored by the Division of Beam Physics, Brookhaven Science Associates, Southeastern Universities Research Association, and Universities Research Association. This year, the winner is:

Zhirong Huang,

"for his analysis of radiation damping and quantum excitation in novel accelerator configurations." Award Committee Chair: Robert Siemann. Thesis Advisor: Ronald Ruth.

1999 IEEE PAC Science and Technology Award.

To recognize outstanding contributions to the development of particle accelerator technology. An award of the Particle Accelerator Conference given on behalf of the

Nuclear and Plasma Sciences Society of the IEEE and sponsored by the NPSS. The Prize Committee Chair was Matthew Allen. This year, the winners are:

Ilan Ben-Zvi,

"for contributions to high-brightness electron beam technology and superconducting rf technology and for his leadership of Brookhaven National Laboratory's Accelerator Technology Facility."

G. William Foster and Gerald P. Jackson, jointly,

"for their leading roles in the conceptualization, design, and development of the first large-scale application of permanent magnet technology for beam transport, in the forms of the 8 GeV Booster to Main Injector transfer line and the Recycler Ring at Fermilab."

Particle Accelerator School Prize for Achievement in Accelerator Physics and Technology .

A prize of the Board of Governors of the USPAS sponsored by Brookhaven Science Associates, Southeastern Universities Research Association, Universities Research Association and John Wiley and Sons, Publishers. The winners will be announced on both the [USPAS](#) and PAC99 web sites. Prize Committee Chair: Robert Siemann

All of the 1999 prizes and awards for achievement in Beam Physics and Accelerator Technology will be presented at an awards ceremony during the 1999 IEEE/APS Particle Accelerator Conference at the banquet to be held Tuesday, **March 30, 1999.**

Six DPB Members Promoted to APS Fellows

The APS Council at its November 1998 meeting has elected to fellowship the following members recommended by the DPB:

Martin Berz,

"for pioneering the application of computational differential algebra to modeling and analysis of beam dynamics"

Gerardo G. Dutto,

"for contributions to the development of high-intensity H- cyclotrons both as meson facilities and for production of proton-rich radioisotopes"

Gerald P. Jackson,

"for conceptual and technical innovations in circular colliders, leading to record-breaking luminosities in the Tevatron and to the Recycler"

James B. Rosenzweig,

"for experimental and theoretical work on plasma wakefield acceleration and focusing techniques, and developments in the theory and diagnosis of high brightness, short pulse electron beams"

Alessandro G. Ruggiero,

"for contributions to accelerator theory, including instabilities and nonlinear dynamics; to accelerator complex designs, notably the Antiproton Source and the Relativistic Heavy Ion Collider; and to accelerator architecture investigation of Spallation Neutron Sources"

Harry Alan Schwettman,

"for contributions in the development and applications of superconducting radiofrequency accelerators and free-electron lasers"

The 1998 DPB Fellowship Committee was chaired by Alexander Chao and included John Cary, John Galayda, Steven Holmes, Richard Sheffield, Cha-Mei Tang and Perry Wilson.

1999/2000 APS Fellows Call for Nominations

The deadline for fellowship nominations for 1999 is fast approaching, **March 15, 1999**. Following that date, we will be accepting nominations for the year 2000 fellows. The deadline for receipt of nominations is March 15, 2000. The original should be sent to:

Judy Franz, APS Executive Officer

APS Headquarters
One Physics Ellipse
College Park, MD 20740

along with a cover letter stating that a copy has been sent to the DPB Vice-Chair, who is also the Fellowship Committee Chair:

Ronald Davidson

PPPL
Princeton University
P.O. Box 451, Princeton, NJ 08543
rdavidson@pppl.gov

Individuals nominated but not recommended to the APS this year in addition to those nominations received after the deadline date will be considered next year. All APS members, and DPB members in particular, are encouraged to give consideration to the nomination for APS Fellowship of individuals who have made outstanding contributions to the field of Beam Physics. Nomination forms can be obtained from APS Headquarters: contact Ken Cole at 301-209-3268 or fellowships@aps.org. Or go to the APS homepage on the web: <http://www.aps.org> and search for "Fellowship Nomination Form."

1999 Annual Business Meeting of the Division at PAC99

The DPB annual business meeting will be held during PAC99 in New York City. It is scheduled for Monday, March 29, 1999 in the Kern/Sullivan Room located on the 5th floor of the Marriott Marquis Hotel immediately following the afternoon program

sessions for that day, scheduled to end at 5:20 p.m. This would mean that the DPB Business Meeting has been scheduled for 5:30 p.m. to 6:30 p.m.

The Business Meeting is an opportunity for members to discuss administrative matters including nomination procedures, appointed committees and other issues of interest to the membership. Newly promoted fellows will be announced and the Chair and Secretary-Treasurer will give their annual reports. Also planned are (1) status reports on PAC99 and the 2000 APS Spring Meeting; (2) a discussion of what we can do as a community to strengthen the potential and future of accelerator physics and technology; and (3) a discussion of the nature of beam/accelerator publication in the electronic era. Please join us.

Future DPB Annual Meetings

2000 APS Spring Meeting

Long Beach, CA

April 29 - May 1, 2000

PAC01

Chicago, IL

June 18-22, 2001

What do you think?

Any ideas for mini-symposia?

Is our community keeping up with the electronic revolution?

How do you see the future of beam/accelerator publications?

Any thoughts on accelerator education?

DPB Membership Falls Below 3% of APS Membership Division Status Threatened!

After first becoming an APS division in 1989, a successful membership drive in the last quarter of 1992 allowed us to reach the magic 3% of APS membership level. We have remained above that threshold since then. However, I have the unpleasant duty to announce to our division membership and our community that in 1999, DPB membership has fallen below the minimum level needed to maintain divisional status. The importance of this threshold arose because a few years ago the APS established a system where divisions are represented in the APS council in proportion to their membership. If a division's membership is above 3%, it is entitled to be represented in the APS council. However, if divisional membership falls below 3% of the total APS membership, the division loses its councilor and is therefore no longer represented in the Council. In addition, fellowship slots are assigned at one slot per 0.5% and we have actually lost one slot recently, going from 7 to 6 slots. Here are our membership numbers for the last eight years, as measured on December 31:

Year	DPB Membership	% of APS Membership
Dec 1991	1142	2.64%

Dec 1992	1477	3.38%
Dec 1993	1466	3.40%
Dec 1994	1426	3.42%
Dec 1995	1316	3.22%
Dec 1996	1272	3.19%
Dec 1997	1244	3.05%
Dec 1998	1240	2.97%

Our field is one of a multidisciplinary nature, with a community of closely working scientists, engineers, technical professionals of many different types and not the least a cadre of managers. This wide range of professionals is both an asset and a liability - an asset because there is great social strength in a community possessing such deep skills and talents; a liability because of the not to be underestimated social obstacles to pulling such a diverse community together, to act as one.

But it is worth trying to do just that. We are all part of a deep and unique enterprise of sophisticated science and technology. Although at times, the present for example, it might appear that we are at a low point, look at the fundamentals and you must conclude that our future is bright indeed. How else can matter be explored and finely impacted. Our competitor is the great field of chemistry, but what an honor to be in the same ballpark!

Getting down to the nitty gritty, it is very important to establish a balanced membership representation as the accelerator/beams field continues to expand in new areas. In the past decade, there has indeed been a remarkable expansion. Beam physics and accelerator technology continues to play an important role in high energy and nuclear physics and it is rapidly expanding in plasma physics, and in what might be termed Light Source Physics. In addition, the field is spreading into defense, medicine and industrial applications.

Currently our membership leans toward the high energy and nuclear areas. Yet it is very important to hear the voices of those representing the new and emerging areas. This can be done only with a properly balanced membership. Please help us to achieve this goal by joining the division or by encouraging your colleagues to join.

As a member of the DPB, you will play a part in electing the division's officers and councilor. With your vote and your voice in the affairs of the division, you will help determine whether the strength of the division leans toward your area or another area.

So please consider joining and help us to save our divisional status. If you know of a colleague who is not a DPB or an APS member, try to get him or her to join the society

and the division. It is so easy. By phone, call the APS Membership Department: 301-209-3280, by e-mail MEMBERSHIP@APS.ORG. You may also look for the membership page on the WWW at <http://www.aps.org>. A regular APS membership is \$90.00. To join our division is only \$6.00. You can use a check or credit card.

This is a very exciting time for beams and accelerators and I hope that your support of future developments in our field will translate into supporting its representation in the American Physical Society at its appropriate division level.

New Electronic Journal Launched: Physical Review Special Topics - Accelerators and Beams [PRSTAB]

With Bob Siemann's strength and inspired leadership, our division, with the APS, especially its chief editor, Marty Blume, has successfully launched a new, fully electronic scholarly journal, Physical Review - Special Topics: Accelerators and Beams (PR-STAB). The APS Council approved it in November 1997 and with amazing speed, the APS machinery splendidly got the first issue posted on the web in May 1998.

Manuscripts began being received in March 1998 and to-date there have been 55 submissions. There have been 25 manuscripts published, i.e. formally posted on the web; in addition, 19 are accepted or in the refereeing phase, while 11 manuscripts have been rejected. It would appear that we are seeing a highly successful venture into scholarly publication.

A major thrust of this new journal has been to make it truly international in character. Our field is best served by encouraging internationalism and a major journal surely should reflect that quality. Without a doubt, we have made a good start in this direction. The editorial board is rather evenly divided among US and non-US members as can be seen from the following list:

Editorial Board

Robert Siemann, Editor
Ilan Ben-Zvi
Michael Craddock
Alex Dragt
Helen Edwards
John Galayda
David Hammer
Ingo Hofmann
Chandrasekhar Joshi
Shin-Ichi Kurokawa
Francesco Ruggiero
Peter Schmueser

Also, submissions have so far reflected an international tendency, with about 50% US submissions and 50% non-US.

The journal, as we have indicated, is fully electronic and was designed to be at no cost both for manuscript submission and for viewing or downloading from the web. So, how is it funded? Nothing in this life is free, as we all know. Well, ingeniously, the originators asked the national laboratories world-wide to support the journal, on the basis of the fact that they were primary beneficiaries. The result so far has been that seven laboratories, ANL, BNL, FNAL, TJNAF, LANL, LBNL and SLAC have become sponsors. These are all US labs, but support is at present being actively considered by several non-US labs. We can only hope that the internationalism we all desire will extend to the area of funding of this extraordinarily unique publication.

Documenting our work for our peers and for future generations is an important part of what we do. We all know that. By helping to fill the void that has existed in the accelerator community for an appropriate refereed journal for both physics and engineering work, this new all-electronic journal would seem to be the answer to our prayers. If you needed more reasons to publish electronically, here are some:

1. PRST-AB is a peer reviewed, American Physical Society journal. Peer reviewed articles benefit from careful reading and criticism of a knowledgeable colleague, and acceptance of an article for publication can be important to one's career.
2. PRST-AB is available to everyone without subscription or pay per view fees, and PRST-AB is an archival journal. The APS is committed to maintaining that availability even as computer technology and software change.
3. PRST-AB has no page limits, so this is the opportunity to expand upon your work without that limitation.
4. Your article will be published in a timely manner and grouped together with other similar work.

So if you have something to say, don't procrastinate. For general info about Physical Review Special Topics- Accelerators and Beams see <http://publish.aps.org/PRSTAB/> and for guidelines for contributions see <http://publish.aps.org/PRSTAB/guidelin.html>.

In addition to the normal PRST-AB publications, the journal is offering for the first time a PAC99 Special Edition. It is an opportunity to expand upon and publish original research presented at PAC99 in a peer reviewed journal. Articles based on PAC99 papers submitted to PRST-AB will be reviewed through the normal refereeing procedure, and if accepted for publication they will be published as regular PRST-AB articles. Publication will be timely; articles will be published as soon as they are ready with no delay waiting for other papers presented at the conference. In addition, a special PAC99 Table of Contents will be created with links to the published papers, and it will be updated each time a paper related to PAC99 is published. If you have any questions or comments about PRST-AB or about the PAC99 Special Edition, for example about duplicate publication relative to the conference proceedings, contact the PRST-AB editor, Bob Siemann at siemann@slac.stanford.edu

Finally, to solicit opinions and ideas about our new journal from the community and to answer any questions you might have, Bob Siemann and others will be available during

a "drop-in" hour for PRST-AB, to take place during PAC99 in New York City. Come one, come all and share your views and concerns with us:

Physical Review Special Topics - Accelerators & Beams

Drop-In Hour at PAC99

Thursday, April 1, 1999, 1530 - 1730

6th Floor Lobby, New York Marriott Marquis

Call for Nominations: 2000 American Physical Society, Robert R. Wilson Prize. "To Recognize and Encourage Outstanding Achievement in the Physics of Particle Accelerators"

Nominations are open to scientists of all nations regardless of the geographical site at which the work was done. The prize shall ordinarily be awarded to one person but may be shared among recipients when all recipients have contributed to the same accomplishment. The prize will normally be awarded for contributions made at an early stage of the recipient's career. Nominations of candidates shall remain active for three years. Send the name of the proposed candidate and supporting information before June 1, to Ken Cole of the APS Honors Program, with a copy to the Prize Committee chair:

Richard J. Briggs

SAIC

279 Bolla Ave.

Alamo, CA 94507

510-552-9746

richard_briggs@saic.cpgm.com

The prize was established in 1986 by the Division of Particles and Fields and the Division of Physics of Beams. It is sponsored by the friends of Robert R. Wilson and is fully endowed. The prize will be presented at the DPB annual meeting during the APS Spring Meeting in Long Beach, CA, April 29-May 1, 2000. The prize consists of \$5,000, an allowance for travel to the meeting at which the prize is awarded, and a certificate citing the contributions made by the recipient. Past Winners:

- 1987 Ernest D. Courant, Brookhaven National Laboratory
- 1988 Donald W. Kerst, University of Wisconsin
- 1989 Martin N. Wilson, Oxford Instruments, England; and Alvin V. Tollestrup, Fermi National Accelerator Lab
- 1990 Kjell Johnsen, CERN
- 1991 John Reginald Richardson, UCLA
- 1992 Rolf Wideroe, Switzerland
- 1993 John P. Blewett, Brookhaven National Laboratory
- 1994 Thomas Collins, Fermi National Accelerator Lab; and Gustav-Adolph Voss, DESY
- 1995 Raphael M. Littauer, Cornell University
- 1996 Albert J. Hofmann, CERN

- 1997 Andrew M. Sessler, Lawrence Berkeley National Laboratory
1998 Matthew Sands, UC Santa Cruz
1999 Robert B. Palmer, Brookhaven National Laboratory

2000 American Physical Society Award for Outstanding Doctoral Research in Beam Physics

The Division of Physics of Beams invites nominations for the 2000 APS Award for the most outstanding Doctoral Research in Beam Physics. A nomination will be accepted for any doctoral student of a university in the United States or abroad, for work performed as part of the requirements for a doctoral degree. Nominees must pass their thesis defense not more than 18 months before the nomination deadline. An individual can only be nominated once; however an unsuccessful candidate can be carried over for 1 year. Nominations should include a letter of nomination, five copies of the thesis and/or equivalent publications, a letter from the thesis advisor delineating in detail contributions of the nominee, the nominee's graduate course record and three independent references, if possible. Submit nominations not later than June 1, 1999, to Ken Cole of the APS Honors Program, with a copy to the award committee chair:

Todd I. Smith
Hansen Lab/Stanford University
Stanford, CA 94305
650-723-1906
tismith@leland.stanford.edu

The award consists of \$2500 and a certificate to be presented during the DPB annual meeting at the APS Spring Meeting in Long Beach, CA, April 29 - May 1, 2000. There is an additional allowance of \$500 for travel and the winner will be invited to present his/her work as an Invited Paper. The award was established by the APS Division of Physics of Beams in 1991 and is supported by Brookhaven Science Associates, Southeastern Universities Research Association, and Universities Research Association. Past Winners:

- 1991 Jeffrey P. Calame, University of Maryland
1992 David H. Whittum, University of California, Berkeley
1993 John A. Palkovic, University of Wisconsin, Madison
1994 Tor Raubenheimer, Stanford University
1995 Dun Xiong Wang, University of Maryland
1996 Dan T. Abell, University of Maryland
1997 Linda Spentzouris, Northwestern University
1998 Bitu Ghaffari, University of Michigan
1999 Zhirong Huang, Stanford University

2001 US Particle Accelerator School Prize for Achievement in Accelerator Physics and Technology

The US Particle Accelerator School invites nominations for prizes awarded on a competitive basis for outstanding accomplishment in accelerator physics and technology. Nominations should include name and institution of candidate and a description of the accomplishment with supporting documents. Submit nominations not later than November 1, 2000 to:

US Particle Accelerator School
c/o Fermilab MS #125
P.O. Box 500
Batavia, IL 60510
phone/fax 630-840-3896/8500
uspas@fnal.gov

Prizes will be presented at the 2001 DPB Annual Meeting during PAC01 in Chicago, Illinois, June 18-22, 2001. Normally 2 prizes each of \$3,000 are awarded. They are made possible by donations from Brookhaven Science Associates, Southeastern Universities Research Association, Universities Research Association and John Wiley and Sons Publishers. This is a prize of the USPAS Board of Governors. Past winners:

1985

Helen T. Edwards, Fermi National Accelerator Laboratory
John M.J. Madey, Stanford University
Special Historic Award

Ernest D. Courant, Brookhaven National Lab
M. Stanley Livingston, MIT
Robert R. Wilson, Cornell University

1986

Helmut Piel, Wuppertal University, Germany
Maury Tigner, Cornell University
Thomas Weiland, DESY

1987

Klaus Halbach, Lawrence Berkeley National Laboratory
Lars Thorndahl, CERN

1988

I.M. Kapchinskii, ITEP, Moscow
V.A. Teplyakov, IHEP, Serpukhov
Andrew M. Sessler, Lawrence Berkeley National Laboratory

1989

Daniel L. Bix, Lawrence Livermore National Laboratory
Karl L. Brown, Stanford Linear Accelerator Center

1990

Donald Prosnitz, Lawrence Livermore National Laboratory
Matthew Sands, University of California, Santa Cruz

1991

Glen R. Lambertson, Lawrence Berkeley National Laboratory
Wolfgang Schnell, CERN

1993

Richard L. Sheffield and John S. Fraser, LANL
Marc C. Ross, Stanford Linear Accelerator Center

1995

Herman Winick, Stanford University
James E Spencer, SLAC
Tsumoru Shintake, KEK

1997

Daniel Boussard, CERN
Chan Joshi, UCLA

1999 USPAS at the University of Chicago, June 14-25, 1999

As part of its program, the US Particle Accelerator School, in association with universities across America, organizes two week schools of intense, graduate-level and more recently, undergraduate courses in beam physics and accelerator technology. There are about 9 courses conducted in parallel offered at each school. By successfully completing the requirements for a full two-week program, a student will earn the equivalent of three semester hours of credit. In the summer of 1999 the program will be at the University of Chicago, June 14-25, 1999. For course descriptions or an application, contact the School Office at Fermilab (phone 630-840-3896, or by e-mail USPAS@FNAL.GOV) or visit <http://fnalpubs.fnal.gov/uspas>. The next school is being planned with Indiana University (held in Tucson, Arizona) January 17-28, 2000.

New Books

USPAS announces two new textbooks published in 1998 by John Wiley and Sons as part of the series on beam physics and accelerator technology:

Principles of RF Linear Accelerators by Thomas P. Wangler (LANL). ISBN 0-471-16814-9, published in April 1998. Hardcover price US\$89.95. The first book that provides a single source of information on all radiofrequency linear accelerators, including electron and ion linacs.

RF Superconductivity for Accelerators by Hasan Padamsee, Jens Knobloch and Tom Hays (Cornell University). ISBN 0-471-15432-6, published in April 1998. Hardcover

price US\$79.95. This comprehensive book on radio frequency (RF) superconductivity offers a modern look at its application to particle accelerators. This book provides a review of the basics of superconductivity as well as up-to-date references.

Order information and order form on line at <http://catalog.wiley.com>. Books will be available for viewing and purchase at the USPAS desk at PAC99.

Announcing the new Handbook of Accelerator Physics and Engineering edited by Alexander W. Chao (SLAC) and Maury Tigner (Cornell University). ISBN hardback 981-02-3500-3, price US\$86; ISBN paperback 981-02-3858-4, price US\$48. To be published in the spring of 1999 by World Scientific Publishing Company. A community project involving more than 200 of the world community of accelerator scientists and technologists has resulted in the production of this new handbook. It is aimed at the design and operation of modern accelerators including Linacs, Synchrotrons and Storage Rings and is intended as a vade mecum for professional engineers and physicists engaged in these subjects. With a collection of 2100 equations, 330 illustrations and 180 tables, here one will find, in addition to the common formulae of previous compilations, hard to find, specialized formulae, recipes and material data pooled from the lifetime experience of many of the world's most able practitioners of the art and science of accelerators. A detailed index is provided together with reliable references to the literature where the most detailed information available on all subjects treated can be found. For further details and ordering, visit the World Scientific web site at <http://www.wspc.com>.

Opportunity in Education

Master of Science Degree in Beam Physics and Technology, Indiana University/US Particle Accelerator School. In addition to traditional programs, the US Particle Accelerator School and Indiana University are proud to announce a partnership offering you an opportunity to earn a Master of Science Degree in beam physics and technology from Indiana University. Participants in the program earn credit toward the Indiana University diploma at our standard USPAS/University-sponsored courses. Briefly, the degree and admission requirements are:

Degree Requirements

- 30 Credit Hours (cr): Grade point average B or above
- 6 IU/USPAS Courses (18 cr)
- Classical Mechanics (3 cr) and Electromagnetism (3 cr)
- Master's Thesis (6 cr)
- Final Examination or oral defense of thesis

Admission Requirements

University transcripts from universities you attended as an undergraduate or graduate student
Completed admissions application
Three letters of recommendation
Outline your interest in beam physics and technology (300-500 words)
Graduate Record Examination, if available (may be requested depending on your other qualifications)
Application Fee: \$40 US

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DPB at the APS Centennial in Atlanta, March 20-26, 1999

The DPB will have three invited sessions and two contributed paper sessions at the Atlanta Centennial Meeting of the APS. Because the Particle Accelerator Conference comes the next week, the DPB has opted for this limited allocation. One of the invited sessions is our own accelerator/beams Centennial Symposium. The other invited sessions are joint sessions with the Divisions of Nuclear Physics and Particles and Fields.

I. Centennial Symposium from the Division of Physics of Beams

The DPB presents a special symposium on the scientific application of accelerators and synchrotron light facilities. The session will include some history, some high energy physics, a featured application of synchrotron radiation to HT superconductivity, and some looks to the future with spallation neutrons and advanced light sources. This session is Thursday March 25th at 11:00 AM. It is Session VA03.

The session will be chaired by Bill Herrmannsfeldt and the speakers will be:

1. **Ernest D. Courant**, "History of Accelerators: a Personal Perspective"
2. **Andrew Sessler**, "Colliders: Past, Present, and Future"
3. **Herman Winick**, "New Paradigms for Synchrotron Light Facilities"
4. **Zhi-Xun Shen**, "Do Frustrated Electrons Conspire To Make High-Tc? - A Photoelectron's Story of Superconductivity." (A Report from Synchrotron-Based Photoemissions Studies)
5. **Andrew D. Taylor**, "Expanding the Frontiers of Neutron Scattering"

II. Joint session with Nuclear Physics and with Biological Physics.

The theme of this session is Biological Science Using Accelerators and Synchrotron Radiation. This is session OB02 at 8:00am, March 24th. The session will be chaired by Herman Winick. The speakers are:

1. **J. Keith Moffat**, "Nanosecond Time-Resolved Crystallography Using Synchrotron Radiation"
2. **Peter Kuhn**, "Challenges in Structural Molecular Biology Attacked by Synchrotron Radiation"
3. **Paul Bertsch**, "Application of Synchrotron-Based Micro-XRF and XAS for the Chemical Speciation of Contaminants in Soils, Waste Forms, and Biota"
4. **Gerhard Kraft**, "High energy, heavy charged particles for biological science and tumor therapy"
5. **John Knezovich**, "Biological and Medical Applications of Accelerator Mass Spectroscopy"

III. Joint session with the Division of Particles and Fields.

The theme of the session is Scientific Impact of High Energy Physics Facilities. This is session **WB05** at 2:00pm Thursday March 25th. This session includes a talk by the Wilson Prize Winner. The session will be chaired by John Peoples. The speakers are:

1. John Seeman, "B-Factories: First Beams at PEP-II and KEKB"
2. David L. Rubin, "High Luminosity Colliders: Results of the CESR Upgrade"
3. John Marriner, "Beam Cooling; the History and the Scientific Impact"
4. Eberhard Keil, "Critical Issues in Large Hadron Colliders"
5. Wilson Prize Winner: Robert Palmer, "Scientific Opportunities with Future Colliding Beam Facilities."

Feature: R&D News at Accelerator Centers

In keeping with our continuing efforts to serve the accelerator community, we are introducing in this newsletter a news column which features R&D being done at accelerator labs around the world. Recognizing the diverse nature of our field, while appreciating at the same time that there is a deep commonality in the many enterprises, we thought it would be of some interest to you to know in a newsy sort of way what was going on at the many R&D centers and how to contact them. We include in the class of accelerator centers, national and international laboratories, university labs, industrial labs and perhaps others that don't quite fit into these categories. This is an ambitious plan and we don't really expect to succeed in having comprehensive and complete coverage right away. But it is a beginning. If we've inadvertently left you out, let us know. If you have any suggestions or comments, we are always interested in your ideas. Remember, the division is yours. Your involvement only makes it stronger.

MESSAGE FROM SLAC:

We are in a time of technological revolution, a revolution driven by commercial applications with potential of enormous markets and profits. There has already been profound impact on accelerators. We could not design, build and operate the present

generation of accelerators without the computer developments of the last decade. Adapting this market driven technology revolution has fundamentally changed the way we think about accelerators. Are there other technologies on the verge of exponential growth in capability and cost-effectiveness that could be as important to us as accelerator scientists? ARDB at SLAC is devoted to identifying those technologies and adapting them to high gradient acceleration.

High power, high efficiency lasers are being realized in the laboratory and moving quickly from the laboratory to commercial laser machining. They have tremendous potential as an accelerator power source. Laser driven plasma accelerators have achieved gradients in excess of 100 GeV/m over short distances. ARDB together with colleagues from LBNL, UCLA and USC are studying an important aspect of plasma acceleration - the interaction of a well-characterized beam with a 1-m long plasma that could be thought of as an early realization of a plasma accelerator module. The experiment, SLAC experiment E-157, will be performed in wake-, rather than laser-driven, configuration in the SLAC FFTB, and will be the first look at this interaction.

Another line of research is laser driven structures. Scaled-down versions of RF structures won't work, and one must look at far-field structures. An experiment to study a crossed-beam, laser-driven accelerator has been designed and installed at the HEPL laboratory on the Stanford campus, and, together with Stanford physicists, we are performing an experiment to demonstrate laser acceleration in this configuration. Follow-on experiments will include multi-cell structures in a variety of one-, two- and three-dimensional arrays.

Many arguments favor short wavelength RF for high gradients, and the current technology revolution taking place in micromachining silicon and metal makes such structures possible. We are studying many aspects of mm-wave (W-band) acceleration including: 1) research in micromachining with a Bay Area company, Ron Witherspoon, Inc.; 2) measuring metal fatigue due to pulsed heating; 3) producing W-band power in a relativistic klystron configuration; 4) designing a sheet beam klystron; and 5) looking at the novel accelerator configurations that would be necessary at W-band. If you are interested in the work at ARDB you should contact Bob Siemann (siemann@slac.stanford.edu) or Dave Whittum (whittum@slac.stanford.edu).

MESSAGE FROM LANL:

On December 22, 1998, DOE Secretary Richardson chose the use of TVA reactors for producing tritium over construction of a new linear accelerator at Savannah River. Consistent with the DOE's dual track strategy for tritium production, the linear-accelerator option has been designated as a backup technology, and the Department will complete key research and development milestones for the accelerator. The Accelerator Production of Tritium (APT) project calls for a linac that operates in a continuous mode (cw) to accelerate a proton beam of 100-mA average current to about 1 GeV. There are two major accelerator R&D areas for the Accelerator Production of Tritium (APT) project. First is a Low Energy Demonstration Accelerator (LEDA), where the principle

activity has been to fabricate and operate a cw normal conducting linac that produces a high quality, 100 mA, continuous proton beam with a final energy of 10 MeV. Second is a superconducting linac technology-development program, to develop and test a prototype superconducting high-energy linac cryomodule.

Construction and operation of LEDA will demonstrate at full power the integrated performance of the low-energy section of the APT accelerator including system availability and component reliability. LEDA will consist of a 75-keV, 110 mA dc injector, a 350-MHz radio-frequency quadrupole (RFQ) linac with final energy of 6.7 MeV, and a 700-MHz coupled-cavity drift-tube linac (CCDTL) with final energy of 10 MeV. Beam operation on LEDA will verify the output beam parameters and will provide an opportunity to look for the formation of beam halo at low energies. LEDA will operate in a continuous mode (cw), but pulsed operation will also be used during commissioning. As of December, 1998, the dc injector and the RFQ have been installed. The 110-mA performance of the dc injector has already been demonstrated. The main activities of LEDA have shifted to the new RFQ, and the initial high-power RF conditioning of the RFQ has begun. One of the main activities in the superconducting linac program has been the fabrication of $\beta=0.64$, 700-MHz, five-cell, RRR-250, niobium superconducting RF cavities. The fabrication of the first two cavities has been completed. The first cavity was built by Los Alamos and fabrication of the second cavity has been completed by Advanced Energy Systems. Both cavities will be tested at Los Alamos beginning in February. Contact:

Tom Wangler, twangler@lanl.gov

MESSAGE FROM BNL:

Accelerator and laser R&D at the BNL - ATF: contact Ilan Ben-Zvi, ilan@bnl.gov. Web site: <http://www.atf.bnl.gov/> The BNL Accelerator Test Facility is a proposal-driven, advisory-committee reviewed users' facility for Accelerator and Beam Physicists. It provides a high brightness electron beam (up to 70 MeV) and synchronized high power laser beams to four beam lines. Its users come from universities, national laboratories and industry. In the past 7 years, 14 graduate students in physics of beams completed their thesis research based on work at the ATF.

Users' experiments in advanced accelerator R&D related to the High Energy Physics mission include experiments in laser acceleration of electrons, wake field acceleration, ultra-precision beam position monitors and more. For example, the Staged Electron Laser Accelerator experiment (STELLA) aims at demonstrating staging of two laser accelerator modules and the achievement of a high quality laser accelerated electron beam.

In the Basic Energy Science area, users do experiments on the generation of radiation (Free-electron Lasers, coherent spontaneous radiation, femtosecond Compton x-rays). Key experiments related to the next generation of light sources are the VISA (Visible

SASE), a collaboration of BNL, LANL, LLNL, SLAC and UCLA, and High Gain Harmonic Generation FEL, a collaboration of ANL and BNL.

Development of phase-space density diagnostics: The ATF is pursuing the development of electron diagnostics aimed at the development of extremely high-brightness electron beams. The diagnostics has two components: A longitudinal time "slice" emittance diagnostic [PRL76, 3723 (1996)] and a transverse phase space tomography diagnostic, [Proceedings of EPAC'98]. The combination of these two diagnostics makes it possible to map the electron bunch phase-space density in 5 dimensions and makes it possible to improve the brightness of electron beams by manipulating its phase space distribution.

Laser photocathode RF guns: We have recently delivered to the ANL Advanced Photon Source one of the recent Gun IV laser photocathode RF units. This gun was tested with dark current and is readied for photo-emission tests. The first version of this gun is operating successfully at a repetition rate of 50 Hz at the University of Tokyo. Other copies of this gun will be in operation at the DUV-FEL and the ATF at BNL and in LLNL.

Terawatt picosecond CO₂ laser: A compact, 30 Joule 10 ps CO₂ laser amplifier has been manufactured in St. Petersburg following a design made by ATF laser physicists. This laser is undergoing acceptance tests at the ATF. It will be useful for laser acceleration R&D, generation of sub picosecond x-ray pulses (through Compton scattering off sub picosecond electron pulses) and other experiments that will make use of the large ponderomotive potential.

Accelerator R&D at the BNL - AGS: contact Thomas Roser, roser@bnl.gov.

The AGS accelerator complex accelerates high intensity proton beams for the production of secondary kaon and muon beams and high brightness gold and polarized proton beams for future injection into RHIC. In all these three modes of operation the AGS has achieved record performances.

Recently a new record intensity of 7.2×10^{13} protons per AGS pulse was accelerated to 24 GeV. At this intensity the coherent betatron tune shift is typically many times the synchrotron tune and stability criteria had to be reevaluated. To avoid instabilities the bunch area is carefully enlarged using a high frequency cavity. The same cavity was used to smooth out beam "hot spots" during the slow-extraction process. Such "hot spots" appear at high intensity and are stable against decoherence. A new method to shorten bunches was developed. Persistent longitudinal quadrupole oscillations were generated using slow adiabatic excitation.

A new method to accumulate high intensity beam was developed to improve the poor bunching factor that is usually obtained during conventional bunch-to-bucket transfers. By using single sine wave "barrier bucket" cavities the circulating beam can remain essentially debunched with only a small gap open for the injection kicker. During high intensity tests beam loading issues were studied and successfully mitigated.

Polarized proton beam has been accelerated in the AGS to a record energy of 25 GeV. More than 40 imperfection depolarizing resonances were overcome with a partial Siberian snake. Depolarization from the strong intrinsic spin resonances driven by the spin precession in the focussing quadrupoles was avoided by driving complete spin flip with nearby artificial spin resonances. The artificial spin resonances were created by adiabatically exciting persistent large coherent vertical betatron motion with a rf dipole magnet. The beam excitation with the rf dipole was very effective in generating large coherent motion without causing emittance growth. It is planned to also use this method to study non-linearities in RHIC.

Studies with gold beam have been mainly focussed on the injection process into the Booster at about 1 MeV/nucleon. The high-quality beam from the Tandem allows for very efficient 4-dimensional phase space painting. However, the intensity is limited to about 2×10^9 gold ions by a strongly intensity dependent loss process. So far studies have focussed on intra-beam scattering and the interaction of the gold beam with secondary electrons. Nevertheless, high brightness gold beams as required for RHIC operation have been produced.

MESSAGE FROM LBNL:

The Accelerator and Fusion Research Division at the Lawrence Berkeley National Laboratory is involved in the R&D of electron, ion and photon beams for various national and international programs and projects. In addition to operating a major on-site synchrotron radiation source, the Advanced Light Source, these projects include: (i) high energy colliders such as the Asymmetric B-factory PEP-II, the Large Hadron Collider (LHC), the Next Linear Collider (NLC) including the Gamma-Gamma collision arm, the Muon Collider, the Very Large Hadron Collider (VLHC) and the Relativistic Klystron Two Beam Accelerator (RKTBA); (ii) various radiation sources such as the Advanced Light Source (ALS) FEL-based x-ray sources, various femtosecond x-ray sources based on laser-plasma-electron beam scattering and interactions, and FELs for POWER BEAMING to satellites; (iii) various advanced accelerator concepts such as laser wakefield and plasma acceleration, optical stochastic cooling of hadron and electron beams, ionization cooling of muon beams, optical monitoring and control of particle beams, etc.; (iv) beam dynamics and technology of acceleration, transport and focussing of high current space-charge dominated ion beams for heavy ion fusion; (v) conventional and novel high field superconducting magnets for collider, radiation source and other applications; (vi) exotic ion sources and ion beam technologies including RFQs for nuclear physics facilities and neutron source facilities (e.g. SNS); (vii) medical applications of accelerator beams as, for example, in accelerators for Boron Neutron Capture Therapy and (viii) theoretical beam dynamics and experimental research in all aspects of beam physics and technology e.g. nonlinear dynamics, beam instabilities, synchrotron radiation, intense beam simulation, laser-plasma-beam simulation, spectrally super-pure RF cavity design, mm-wave and THz technology, beam diagnostics, control and feedback systems and quantum aspects of beam physics. There are various state-of-the-art laboratories including chirped pulse amplified short pulse lasers (I'OASIS lab), microwave and RF laboratories (the Beam

Electrodynamics Lab), Beam Test Facility (BTF) at the ALS, the Low Beta Laboratory, the RTA test facility, the magnet fabrication and testing labs, the Multiple Beam Experiment MBE-4, Ion Source Test Stands, etc. These R@D activities are carried out via four major Programs of the Accelerator and Fusion Research Division (Director: William A. Barletta):

Center for Beam Physics Program: HEAD -> Swapan Chattopadhyay (chapon@lbl.gov)
Ion Beam Technologies Program: HEAD-> Richard A. Gough (RAGough@lbl.gov)
Superconducting Magnets Program: HEAD -> Ronald M. Scanlan (RMScanlan@lbl.gov)
Fusion Energy Research Program: HEAD -> Roger O. Bangerter (ROBangerter@lbl.gov)

The division has symbiotic relationships with the Univ. of California at Berkeley, Davis and UCLA campuses with comprehensive faculty, staff, student and instructional exchange programs. For more information visit our website <http://www.lbl.gov/scientific>, "programs/AFRD" and <http://www.lbl.gov/educational>, "sites/world of beams."

MESSAGE FROM AES:

On September 28, 1998, the former employees of Northrop Grumman's Advanced Energy Systems Group completed the formation of a new small business, Advanced Energy Systems, Inc. (AES). Incorporated in New York and purchased from Northrop Grumman as a legacy organization, AES retains all former assets including the skilled personnel, intellectual property, accelerator development laboratories, prototype machine shops, computational analysis systems and contracts. The new company can draw upon a 22 year experience base in accelerator and fusion technology to supply full service engineering and physics analysis & design, in addition to component fabrication. Our active customers include many US national laboratories, international laboratories, and commercial corporations.

Specific areas of AES expertise include: electron accelerators and free electron lasers, advanced radiation sources, lowenergy ion accelerator systems for commercial applications, high power ion accelerator systems for government applications and fusion systems.

On-going development programs at AES include:

Contraband Detection System (CDS) - presently funded by the FAA and operating in our Bethpage, NY facility, the CDS project has demonstrated the highest proton current from a compact tandem electrostatic accelerator. The system, to be utilized for cargo inspection or site protection, is based on gamma resonance imaging and was produced in collaboration with TRIUMF.

Compact Infrared Free Electron Laser (CIRFEL) - AES designed, built and commissioned the CIRFEL which presently operates from 11 to 20 microns, based upon

technology transferred from Brookhaven National Laboratory. The device is located at Princeton University. A similar AES electron beamline was recently delivered to the Brookhaven LEAF facility to perform pulse radiolysis analysis.

Infrared Free Electron Laser (IRFEL) - Under a CRADA with the Thomas Jefferson National Accelerator Facility, AES has provided support to the JLab IRFEL project. AES activities have ranged from magnet design and superconducting RF support to the design and fabrication of an electromagnetic optical klystron wiggler.

Spallation Neutron Source (SNS) - AES has supported Los Alamos in the R&D phase of the injector project. This work has included engineering design and analysis, system studies, RAM analysis, costing, producibility studies and manufacturing planning.

Accelerator Production of Tritium (APT) - Since 1989, AES has provided technical support to the Los Alamos LEDA project. Specific tasks have included RFQ design support, CCDTL RF support, systems analysis including configuration optimization, RAM and costing, the development of a Niobium tube branch-puller and the fabrication of a five cell superconducting RF cavity.

AES is presently headquartered in the Northrop Grumman facilities in Bethpage, New York, and also maintains a local office in Princeton, New Jersey.

For additional information please contact:

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MESSAGE FROM TJNAF:

Jefferson Lab accelerator R&D targets the technologically interrelated primary and secondary mission objectives of nuclear physics experimentation and free-electron laser (FEL) development. The CEBAF superconducting radio-frequency (SRF) accelerator, designed for 4 GeV, now operates at 5.5 GeV thanks in large part to in situ cavity helium processing. To extend recent cryomodule R&D - conducted partly in association with FEL development - would permit overall design improvements for evolution to 12 GeV. (SRF contact: Jean Delayen, Delayen@JLab.org, 757 269-7420.) Injector work addresses multiple objectives including development of a high-precision absolute polarimeter; extreme high vacuum ($< 10^{*-12}$ torr) techniques for improving polarized-source photocathode lifetimes and for developing a new load-locked polarized gun; new, higher-average-power RF-locked laser systems for the polarized source; improvements to quantum efficiency and polarization from polarized source photocathodes; elimination of the small helicity-correlated effects associated with

polarization reversal; and, for the FEL photoemission gun, high-voltage breakdown. (Injector contact: Charles Sinclair, Sinclair@JLab.org, 757-269-7679.) Machine optics development has yielded improvements in beam quality and beam delivery reliability. Digital feedback systems allow excellent energy and beam position stabilization on the nuclear physics targets, and new absolute energy calibration methods open the possibility for new high-precision experiments. (Operations contact: Andrew Hutton, Andrew@JLab.org, 757 269-7396.) The recently completed 3-6 fm tunable FEL, driven by a 42 MeV SRF linac, has operated stably at power levels up to 311 W cw - 28 times higher than any previous FEL. A transport lattice is in commissioning to recirculate the electron beam for kW-scale average power with 75% energy recovery. Because this recirculation introduces the emittance-degradation problem of bunch self-interaction by coherent synchrotron radiation (CSR) and the space-charge force, an extensive theoretical study of CSR is also underway, with plans for future comparisons of simulations with experiments conducted at Jefferson Lab and elsewhere. (FEL contact: H. F. Dylla, Dylla@JLab.org, 757-269-7450.) For further information, see Jefferson Lab's PAC99 papers, contact one of the managers above, or contact Christoph Leemann (Leemann@JLab.org, 757-269-7575).

MESSAGE FROM FNAL:

In February 1998, the Fermilab Beams Division reorganized its accelerator R&D activities and consolidated several special projects into an Accelerator Technologies Group to help set R&D priorities and more efficiently allocate limited resources. The Accelerator Technologies (AT) Group is lead by Robert Noble with Patrick Colestock a