
Topical Group on Few-Body
Systems
and Multiparticle Dynamics

Newsletter, February 2004



TABLE OF CONTENTS

[Message from the Chair](#)

[Elections](#) (Deadline April 23, 2004)

[Call for Fellowship nominations](#) (Deadline
April 1, 2004)

[APS Spring meeting](#) (Denver, April 30-May
4, 2004)

[Other APS Meetings](#)

[Gordon Conferences](#)

[Election Candidates](#)

[Candidates for Vice-Chair](#)

[Richard Milner \(MIT\)](#)

[Werner Tornow \(Duke\)](#)

[Candidates for Executive Committee](#)

[Ricardo Alarcon \(Arizona State\)](#)

[Chris Greene \(Univ. Colorado/JILA\)](#)

[Paul Julienne \(NIST\)](#)

[Wally Van Orden \(Old Dominion\)](#)

● MESSAGE FROM THE CHAIR

Greetings to all members of the Few-Body Group and best wishes for the coming year. By consensus of our Executive Committee, GFB is going electronic, with respect to both newsletters and elections. We have been posting our newsletters on the web for some time, and voting electronically for the past few years as well. This year, we

will be mailing neither paper ballots nor printed newsletters, unless you are one of the handful of members who do not have valid email addresses or, for some reason, your email bounces.

It is once again election time. We have a strong slate of candidates for vice-chair and the executive committee. Each candidate has provided biographical material and a short statement, which you can read below. Bear in mind that we have a diverse Group, reflecting the fact that our members come from atomic, molecular, nuclear, mathematical, chemical, particle physics. Our Executive Committee has always reflected this rich mix of backgrounds and interests. So please vote for the new leadership that will continue our partnership. Please consider this excellent choice of candidates carefully. You will receive email with instructions about voting. Voting on line is easy and fast.

The new executive committee members will replace Lee Collins and Harold Fearing, who are rotating off the committee this year. And with the election of a new vice-chair, our past-chair, Virginia Brown, will be leaving the GFB officers. Virginia has given us four years of dedicated service and, among many other things, has worked hard to increase our membership. She is a wonderful colleague and true friend of GFB. I also want to thank our new Secretary-Treasurer, Charlotte Elster, who has put in a very successful first year and helped keep GFB running properly.

Traditionally the GFB holds its annual gathering at the Spring meeting of the American Physical Society and this year is no exception. The Spring meeting this year will be held April 30 - May 4 in Denver. Based on the size of its membership, the GFB gets currently one invited session at this meeting. This year, we used that single invited session allotment to co-organize two joint sessions, one with the DNP /DCOMP

and one with the the Topical Group on Hadronic Physics(GHP). I want to thank our chair-elect, Rocco Schiavilla, who was involved with the organization of both these sessions. You will find more details about this meeting below. We encourage you to come to the GFB business meeting which will also be held during the Spring meeting. You will be receiving email giving the date and location of the business meeting.

DNP provides the largest source of GFB membership, while DAMOP is a close second. We also have a growing number of DCOMP members in GFB. DAMOP made the decision to no longer participate in the Spring meeting, but both DAMOP and DCOMP have a strong presence at the March meeting. We are therefore pleased to have been given the opportunity to co-sponsor an invited session at the upcoming March APS meeting (Montreal, March 22-26, 2004) with DCOMP. Special thanks to Barry Schneider, DCOMP chair-elect, who helped me in setting up this co-sponsored session. We are also pleased to continue our strong intellectual ties with DAMOP; GFB will co-sponsor an invited session at this year's DAMOP meeting in Tucson (May 25-29). I want to thank Chris Greene for co-organizing this session. You will find more details about both meetings below.

Membership numbers in GFB continue to be a concern. While our membership grew over the past year, reversing the trend of steadily declining numbers in past years, the number of GFB members needs to be increased or we could lose our status as an APS Topical Group. Membership in GFB allows you to support an important forum for research in few-body physics. Our status in APS, the number of Fellows we can nominate and the number of symposia we can sponsor at APS meetings all depend on the number of GFB members. Past experience has shown that personal contact is the most

effective way to grow our membership. Since we are a small Topical Group, we can increase our numbers significantly by each getting a new member, as well as reminding former members to re-join. It is easy to join our Topical Group online at <http://www.aps.org/memb/unitapp.html> . However, this may disadvantage new members who want to join the GFB mid-cycle in their APS billing period. We suggest that you contact the APS Membership Department at 301-209-3280 or membership@aps.org to request GFB membership and a prorated dues payment. Don't forget, students can join APS with the first year free and get all the benefits of APS membership. Encourage your students to join the APS and the GFB.

Finally, I would like to congratulate Hartmuth Arenhövel, Ronald Gilman and Jay Wallace Van Orden who were all elected to APS Fellowship this year under GFB sponsorship.

Tom Rescigno, Chair GFB 2003-2004

[Return to top](#)

● **ELECTIONS --- ELECTRONIC VOTING**

We will elect a Vice-Chair and two members of our Executive Committee. The Vice-Chair serves a term of one year, becomes Chair-Elect the next year, and assumes the Chair the following year. The Secretary-Treasurer and the Members-at-large of the Executive Committee serve three-year terms. The newly elected officers will assume their positions beginning May 2004.

Richard Milner and Werner Tornow are the candidates for Vice Chair. Candidates for the Executive Committee are Ricardo Alarcon, Chris Greene, Paul Julienne and Wally Van Orden. Brief biographies and statements of the candidates are

given below.

The present officers are Virginia Brown, Past-Chair; Tom Rescigno, Chair; Rocco Schiavilla, Chair-Elect; Colm Whelan, Vice-Chair; Charlotte Elster, Secretary-Treasurer. The current Executive Committee members (and the years their terms expire) are: Ben Gibson (06), Ravi Rau (06), Dan Phillips (05), Joe Macek (05), Lee Collins (04) and Harold Fearing (04).

The voting this year will be done electronically. All current GFB members will receive a separate email message which gives the Web Site for elections and instructions about voting. Please make sure to vote before the **23 April DEADLINE**.

[Return to top](#)

● **CALL FOR APS FELLOWSHIP NOMINATIONS**

A major benefit to the members of the topical group is that the group can nominate members to become Fellows of the Society. The number of nominations the group can put forward depends predominantly on its total membership. The choice of our candidate(s) from among those next nominated will be made by our current Fellowship Committee: Colm Whelan, Lee Collins, and Bob Wiringa. I urge you to think about colleagues worthy of Fellowship who have never been elected and get together the necessary material for nomination to APS. Current APS members and their affiliations can be found on the APS website. Bear in mind that the few- body community, which is quite active outside the United States, has a number of distinguished physicists from foreign institutions who are not APS Fellows. If we nominate two of these members for APS Fellowship, we may be able to promote two GFB members to fellowship using the leverage

of co-sponsorship with the International Forum. I also ask you to consider worthy candidates from under-represented minority groups. We had three excellent new Fellows (see below) elected through our group last year. Our Fellowship Committee can only make recommendations on the nomination packages that are submitted by our membership, so let's do our part and nominate deserving candidates.

Information regarding the nomination procedure and the necessary forms can be easily obtained through the APS home page (www.aps.org/fellowship/) or our own group home page (under Fellows). The DEADLINE for nominations for our Topical Group is 1 April each year. Please make sure the full package has been submitted to the APS before this date.

CONGRATULATIONS TO OUR NEW FELLOWS

Congratulations to Hartmuth Arenhövel, Ronald Gilman and Jay Wallace Van Orden, who were elected to Fellowship in the APS under the wings of the GFB last year.

Arenhövel's fellowship citation reads, *"For his contribution in understanding photo- and electrodisintegration of the deuteron, especially with incorporation of isobar degrees of freedom and meson exchange currents."*

Gilman was cited, *"For his studies of the transition region between pion/nucleon and quark/gluon degrees of freedom via recoil proton polarization measurements "*.

Finally, Van Orden was cited *"For contributions to the understanding of relativistic effects in few- and many-body nuclei with particular emphasis on covariant calculations of the electromagnetic properties of the deuteron."*

[Return to top](#)

● **APRIL MEETING**

The APS "April" Meeting will be held from April 30-May 4, 2004 in Denver, Colorado. GFB has received one slot at the April Meeting in recent years which it can leverage through co-sponsorship with other APS units. At this Spring meeting we are co-sponsoring two invited sessions. One session (B7) is on "Baryon Physics" and is joint with the Hadronic Physics Topical Group (GHP). It will feature talks by S. Dytman (Pittsburg), E. Smith (JLab), D. Diakonov (JLab/Nordita) and Z. Fodor (Wuppertal/Eotvos University). The other session (D5) is on "Recent Developments in Computational Nuclear Physics", joint with DNP and DCOMP; the speakers will be C. Fryer (LANL), K. Nollett (Argonne), P. Navratil (LLNL), K. Schmidt (Arizona State) and D. Richards (JLab). Members are urged to keep abreast of the latest developments via the APS Webpages and other APS announcements.

[Return to top](#)

● **OTHER APS MEETINGS**

GFB at the APS March Meeting

GFB will co-sponsor an invited symposium with DCOMP at the APS March meeting in Montreal (<http://www.aps.org/meet/MAR04/>). Session S6, to be held Wednesday afternoon, March 24, will be devoted to "Large-scale Computational Approaches to Few-Body Physics Problems" and will feature talks by Dave Schultz, Lubos Mitas, Luis Lehner, Bill McCurdy and Peter Lepage on a broad range of topics.

GFB at the DAMOP Meeting

GFB will co-sponsor an invited session at the DAMOP meeting (<http://www.aps.org/meet/DAMOP04/>), to be held May 25-29 in Tucson, AZ. The session topic is "Dynamics of Low-Energy Electron-Molecule Collisions" and will feature talks by Michael Allan, Ilya Fabrikant, Tim Gay and Wim Vanroose. Please check the DAMOP website for further details.

[Return to top](#)

● GORDON CONFERENCES

There is not currently a Gordon Conference on Few Body Problems. However, there are Gordon Conferences on Atomic and Molecular Interactions and on Nuclear Chemistry that will be of interest to some of our membership.

- The Atomic and Molecular Interactions Gordon Conference will take place July 11-16 at Colby-Sawyer College in New London, NH. You will find details at the website - <http://www.grc.org/programs/2004/atomic.htm>.
- The Gordon Conference on Nuclear Chemistry will be held June 13-18 at Colby-Sawyer College in New London, NH. The website for the meeting is <http://www.grc.org/programs/2004/nuchem.htm> - check it out.
- The Gordon Conference on Photonuclear Reactions will be held August 1-6 at the Tilton School in Tilton, NH. The details for this meeting at <http://www.grc.org/programs/2004/photonuc.htm> or contact [D. Phillips](#) for more information.

[Return to top](#)

● CANDIDATES BIOGRAPHIES AND STATEMENTS

CANDIDATES FOR VICE-CHAIR

Richard Milner

Massachusetts Institute of Technology

BIOGRAPHY

Richard Milner is a Professor of Physics at the Massachusetts Institute of Technology where he directs the Bates Linear Accelerator Center. Richard graduated from Caltech with a Ph.D. in experimental nuclear physics in 1985. He has worked on a number of experiments which use spin observables to address problems in hadron structure. These include: the first experiments at Bates to measure spin-dependent electron scattering from polarized He-3 to extract information on the neutron form-factors; a measurement of spin-dependent quasielastic proton scattering from polarized He-3 at IUCF to determine the ground state spin structure of He-3; and the HERMES experiment at DESY to investigate the spin structure of the nucleon. At present, measurement of spin-dependent electron scattering from polarized few body systems at Bates with the Bates Large Acceptance Spectrometer (BLAST) is Prof. Milner's main scientific focus.

CANDIDATE'S STATEMENT

Physicists strive to understand the physical world in terms of the simplest explanation. Often, a complex problem can be reduced to one involving a few body system. Study of the Earth-Moon-Sun system, the helium atom, and the quark model of hadrons all have provided important insight vital to understanding the full Solar System, heavy atoms and hadron structure, respectively. Thus, the study of few body systems continues to remain an important area of research in physics. The GFB is a central forum for physicists to communicate new ideas and results on few body systems across the traditional boundaries of the divisions.

The challenge is to develop meeting programs which present cutting-edge research in the area of few body systems and to attract attendance from the broader scientific community. In particular, the work of young researchers should be highlighted.

[Return to top](#)

[Return to biographies listing](#)

Werner Tornow

Duke University

BIOGRAPHY

Werner Tornow is an experimental nuclear physicist. He is a Professor of Physics at Duke University and the current Director of the Triangle Universities Nuclear Laboratory (TUNL). He received his diploma degree (1967) and his doctoral degree (Dr. rer. nat., summa cum laude, 1972) from the University of Tübingen, Germany. He continued his research and teaching activities at the University of Tübingen until 1985, interrupted by a 2-year Research Associate term at Duke University (1975-76). In 1979

he was awarded the so-called Habilitation (Dr. rer. nat. habil.). In the summer of 1985 Werner Tornow rejoined Duke University. He became Research Associate Professor in 1988 and Research Professor in 1994. After a one-year term as Deputy Director of TUNL he became Director of TUNL in 1996. In 1999 he was appointed Professor of Physics at Duke University. Werner Tornow is a Fellow of the APS (1998). He served on two Division of Nuclear Physics/APS Fellowship Committees (2002-03). He co-organized a Mini-Symposium on “Three-Nucleon Force Effects and the A_y Puzzle” at the Hawaii 2001 Joint Meeting of the Nuclear Divisions of APS and JPS. He was also the main organizer of the International Workshop on Fundamental Physics with Pulsed Neutron Beams (Durham, 2000) and the RIA Workshop (Durham, 2000). He has been a member of the International Advisory Committees for the 13th (Adelaide, 1992) and 16th (Taipei, 2000) International IUPAP Conferences on Few-Body Problems in Physics. He served as the main organizer of the 17th (Durham, NC, 2003) conference of this series. He also has been a member of the International Advisory Committees for the Asia-Pacific Conferences on Few-Body Problems in Physics (Tokyo, 1999 and Shanghai, 2002) and for the “Symmetries and Spin” series (Prague, 2001, 2002, and 2003). He has been a member of the IUCF Program Advisory Committee (1998-2002), and is currently a member of the RIA Steering Committee and the Executive Committees of the US-KamLAND and Majorana Collaborations. He is the PI of the DOE funded upgrade of the free-electron laser based High-Intensity Gamma-ray Source (HIGS) at Duke University. In 2000 Werner Tornow joined the Editorial Board of Few-Body Systems and in 2002 he became Field Editor for Experimental Physics. Werner Tornow’s research interests continue to be in low-energy few-body physics, especially with neutrons and g rays as probes. His emphasis is on polarization phenomena in 2 to 4-nucleon reactions. More recently, he has become involved in weak-interaction studies, especially anti-neutrino oscillations and double-beta decay. Very recently, he has started to apply his knowledge in experimental nuclear physics to National Nuclear Security related topics.

CANDIDATE'S STATEMENT

The importance of Few-Body Systems and Multiparticle Dynamics is obvious to us, but we need to convey our message to a broader community and equally important, to the younger generation. With the worldwide demise of most low-energy few-body facilities, it is imperative to concentrate on the surviving, mostly intermediate energy, facilities and their research staff and user communities as a resource for our field, otherwise our Topical Group will shrink considerably in the foreseeable future. The present federal funding scenario clearly favors applied physics over fundamental physics. It will be a challenge for our group to successfully compete for adequate resources, unless we can convince the funding agencies that few-body physics has made substantial contributions to the broader physics community and, in fact, has the potential to do even more. When I studied parts of our Few-Body Systems and Multiparticle Dynamics research activities in preparation for my talk on “Atomic, Molecular, and Nuclear Three-Body Physics: An Experimentalist’s View” at the APS Centennial Meeting (Atlanta, 1999), it struck me how deeply some of us were involved in multidisciplinary research activities. We were not only playing a supporting role, but in some areas few-body physics input was essential. More recently, this tendency has increased, especially with the rapid progress in effective field theories and their important contributions, for example, to Weak-Interaction physics and Nuclear Astrophysics. In addition, few-body techniques applied to studying the dynamics of Bose-Einstein Condensates are now very popular. First applications in Nanoscience are on the horizon. We are well positioned, but we

need to get the message across

[Return to top](#)

[Return to biographies listing](#)

● CANDIDATES FOR EXECUTIVE COMMITTEE

Ricardo Alarcon

Arizona State University

BIOGRAPHY

Ricardo Alarcon is currently a Professor of Physics at Arizona State University. His research involves experiments designed to study the spin dependent electromagnetic response of few-body nuclei in a comprehensive and precise way. He did his undergraduate studies at the University of Chile and received his Ph.D. in 1985 from Ohio University. He did postdoctoral work at the University of Illinois at Urbana-Champaign until 1989 when he joined Arizona State University as an Assistant Professor. He has held visiting professor appointments at MIT in 1995-97 and 1999-2001. He served as Project Manager for the BLAST project at MIT-Bates during 1999-2002. He has been Scientific Spokesperson of the BLAST Collaboration since 2000. During the 1998-2001 he served as President of the Bates Linear Accelerator Users Group, Inc. At the present time, he is a member of the DOE/NSF Nuclear Science Advisory Committee (NSAC). He served between 2001-2003 in the APS Committee on Minorities. In 2003 he was elected a Fellow of the APS.

CANDIDATE'S STATEMENT

Few-body physics embodies theoretical and experimental studies of fundamental dynamical systems across many disciplines. The Few-Body Systems and Multiparticle Dynamics Topical Group (GFB) is thus an ideal forum to unify different disciplines with common interests. The GFB serves as a catalyst within the APS to communicate the intellectual excitement of the different disciplines. As an executive committee member, my goals would include increasing the membership of the GFB and enhancing the GFB visibility throughout the scientific community. To do so, I would strive to further the group's recruitment of young scientists working on few-body physics by increasing our visibility as well as enhance communication between APS units.

[Return to top](#)

[Return to biographies listing](#)

Chris H. Greene

University of Colorado / JILA

BIOGRAPHY

B.S. (Physics and Mathematics), University of Nebraska, 1976; Ph.D. Physics), University of Chicago, 1980; Postdoctoral Research Associate (Chemistry), Stanford University, 1980-81; Assistant Professor, Associate Professor, and Professor of Physics, Louisiana State University, 1981-88; Professor of Physics and Fellow of JILA, University of Colorado, 1988-present; Visiting Researcher, Laboratoire Aime Cotton, Orsay, 1993; I. I. Rabi Prize of the American Physical Society, 1991; APS Fellow, 1990; NSF Presidential Young Investigator, 1985-1990; Alfred P. Sloan Foundation Fellow, 1983-87; Louisiana State University Sigma Xi Award for Research in the Physical and Natural Sciences, 1984; Chair, 2001 I. I. Rabi Prize Committee; Director, Center for Theoretical Atomic, Molecular, and Optical Physics at JILA/CU, 1990-1999; Vice Chair (1992-93) and Chair (1994-95), Gordon Conference on Atomic Physics; ICPEAC Organizing Committee, 1983-86; DAMOP Chair (2002-03), Chair-Elect (2001-02), Vice-Chair (2000-01), Executive Committee, 1991-94; Chair, AMO Physics Working Group, 1998 Workshop on Scientific Directions at the Advanced Light Source; Chair, Theory of Structure and Dynamics Panel, 1997 Department of Energy Workshop on Atomic, Molecular, and Optical Physics. RESEARCH INTERESTS: Nonperturbative correlations among different quantum mechanical degrees of freedom in atomic and molecular systems; double photoionization of two- and three-electron atoms; ultracold collisions of two or three atoms; the theory of Bose-Einstein condensation; multichannel atomic and molecular Rydberg states and their properties in an external field; anisotropy produced in photofragmentation and the use of laser-induced fluorescence as a probe; linking quantum and semiclassical descriptions of highly correlated systems.

CANDIDATE'S STATEMENT

My theoretical research involves few-body interactions, covering the gamut from single atoms, to simple molecular species, and all the way up to the interactions of two or three atoms within a Bose-Einstein condensate. I have always been struck by the fundamental nature of questions in this field, and excited by the challenges encountered in understanding the nature of such tantalizingly simple systems. One of the specific things that appeals to me about the few-body community is the sharing of progress in the development of theoretical and experimental techniques. These cut intriguingly across a broad swath of disciplines. I like the idea of encouraging and supporting forefront workshops and meetings that showcase subject areas at the cutting edges of physics and chemistry.

[Return to top](#)

[Return to biographies listing](#)

Paul Julienne

NIST

BIOGRAPHY

Paul S. Julienne earned his Ph. D. in Chemical Physics from the University of North Carolina in 1969. After serving as a NRC postdoctoral associate at the National Bureau of Standards, he worked in the Plasma Physics Division at the Naval Research Laboratory and returned to NBS in 1974 as a staff scientist. He currently is a NIST Fellow in the Atomic Physics Division of the Physics Laboratory of the National Institute of Standards and Technology. He has served on the NAS Committee on

Atomic, Molecular, and Optical Sciences, the DAMOP Thesis Prize Committee, and the DAMOP Nominating Committee. He is a Fellow of the American Physical Society, and will receive the 2004 Davisson-Germer Prize in Surface or Atomic Physics, cited "for his pioneering studies of the theory of ultracold atomic collisions, and its applications to precision metrology and quantum gas dynamics." His research interests involve the theory of atomic and molecular collisions and spectroscopy, ab initio calculations, and most recently, the theory of collisional phenomena involving cold, trapped atoms and molecules in Bose-Einstein condensates or optical lattices.

CANDIDATE'S STATEMENT

One appealing aspect of few-body physics is the intrinsically multidisciplinary character of the subject. My involvement with current research with ultracold atoms in quantum degenerate gases and optical lattice cells shows that there are whole new areas of investigation developing with new avenues for investigating few-body phenomena as well as opportunities to learn from what has already been developed in other few-body disciplines. Scattering resonances, three-body collisions, molecule formation, and atom-molecule collisions in the ultracold domain are just a few of the areas where there are new opportunities for theoretical and experimental study. Experimental studies with three atoms trapped in single trapping cells now seem feasible. I would hope to encourage ways to finding cross-disciplinary links between those working in these new areas and those working on more established theoretical problems in the AMO, chemical, condensed matter, and nuclear physics communities.

[Return to top](#)

[Return to biographies listing](#)

Wally Van Orden

Old Dominion University

BIOGRAPHY

Wally Van Orden is Professor of Physics and Eminent Scholar at Old Dominion University in Norfolk, Virginia and a staff scientist at Jefferson Lab in Newport News, Virginia. He received his B.S. degree from Utah State University in 1973. He obtained his graduate education at Stanford University where he received an M.S. in 1975 and a Ph.D. in 1978 working under the supervision of T. W. Donnelly on a study of the contributions of two-body currents in quasielastic electron scattering from nuclei. Wally became a postdoctoral research assistant at the University of Maryland in College Park in 1978 and became an Assistant Professor in 1981. During his time at Maryland he worked on problems related to the scattering of pions, protons and electrons from nuclei. This work included the first relativistic distorted wave impulse approximation (DWIA) calculations of the (e,e'p) reaction and work was begun on a relativistic quasipotential model of the deuteron in collaboration with Franz Gross of the College of William and Mary. In 1988, Wally was a visiting scientist at CEBAF (now Jefferson Lab) and became a staff scientist there in 1989. In 1990 he became an Associate Professor at Old Dominion University while continuing as a staff scientist with the theory group at Jefferson Lab. Since 1990, his work has focused on the electromagnetic properties of the deuteron, weak and electromagnetic interactions in relativistic quark models and some formal

aspects of quasipotential approaches to two- and three-body nuclei.

CANDIDATE'S STATEMENT

Although my initial work in nuclear physics was concerned with nuclear matter and light to medium nuclei, my work during the last 15 years has been primarily focused on few-body systems of nucleons and quarks. Recently, Colm Whelan joined us as Department Chair at Old Dominion. I was interested to see how much of his work with electron scattering from atoms was similar to work being done in nuclear physics. I have come to believe that the GFB needs to expend more effort in providing opportunities for interaction among few-body physicist from various fields. If elected, I would work with the officers of the GFB to find ways of accomplishing this goal.

[Return to top](#)

[Return to biographies listing](#)
