

# Topical Group on Few-Body Systems and Multiparticle Dynamics

Newsletter, March 2001

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## MESSAGE FROM THE CHAIR

Greetings to all members of the Few-Body Topical Group, and best wishes for the coming year.

It is once again time to elect the officers of the Few-Body Systems and Multiparticle Dynamics Topical Group. We have a strong slate of candidates for vice-chair and the executive committee. We urge you to vote by either

returning the enclosed ballot or via the internet at <http://www.physics.wm.edu/~carlson/ballot01.html> .

The annual meeting will be held during the spring meeting in Washington D.C., April 28 to May 1! We hope to see you there. Jim McGuire, Virginia Brown and Aron Bernstein have organized several very interesting invited sessions, which are listed below.

We also need to increase our membership, which has slowly been declining. Please urge colleagues and graduate students working in the field to join our group. Membership directly relates to the number of fellows we can sponsor and the number of invited sessions we can organize at APS meetings.

Best regards, Dennis Skopik

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## ELECTIONS --- ELECTRONIC VOTING

Enclosed is your ballot for our 2001 election of officers. 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 following the Topical Group's Business Meeting, which will be held during the April Meeting in Washington, D.C.

Jim Feagin and Tom Rescigno are the candidates for Vice Chair. Candidates for the Executive Committee Lee Collins, Don Madison, Harold Fearing, Greg Smith, and Lawrence Weinstein (Old Dominion). Brief biographies and statements of the candidates are given below.

The present officers are Barry Schneider, Past-Chair; Dennis Skopik, Chair; Jim McGuire, Chair-Elect; Virginia Brown, Vice-Chair; Carl Carlson, Secretary-Treasurer. The Executive Committee members are: C. William (Bill) McCurdy (03), Wayne Polyzou (03), Bunny Clark (02), Eric Heller (02) Jerry Feldman (01), and John Morgan (01).

You may vote electronically by going to Web Site

<http://www.physics.wm.edu/~carlson/ballot01.html>

or you may vote by paper ballot submitted by regular mail (but not both!). Either way please ensure your ballot is received before the 30 April DEADLINE.

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## 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 our total membership. The choice of our candidate(s) from among those next nominated will be made by our current Fellowship Committee: Virginia Brown (chair), David Ernst, and Kate Kirby. 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. We had two excellent new Fellows (see below) elected through our group last year. We still have many qualified group members who are not yet Fellows, so let's nominate them.

Information regarding the nomination procedure and the necessary forms can be easily obtained through the APS home page ([www.aps.org/fellowship/](http://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

Vitaly Efimov and Colm Thomas Whelan were elected to Fellowship in the APS under the wings of the GFB last year. Congratulations to both of them. Efimov's fellowship citation read "*For investigation of the Quantum three-body problem, and especially for his discovery of weakly bound states (called Efimov states) of three quantum particles.*" Whelan's citation read "*For many significant contributions to atomic collisions theory and most especially for original work on (e,2e) and related processes.*"

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## APRIL MEETING

The APS April Meeting will be held from April 28 - May 1, 2001 in Washington, D. C..

At the Spring meeting we have two sessions co-sponsored with DNP, one with DAP and one with FHP (Forum on the History of Physics). The FHP session covers atomic physics. We may also have a session at the DAMOP meeting co-sponsored with DAMOP. Members are urged to keep abreast of the latest developments via the APS Webpages and other APS announcements.

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## CANDIDATES BIOGRAPHIES AND STATEMENTS

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## CANDIDATES FOR VICE-CHAIR

**Jim Feagin**

California State University-Fullerton

BIOGRAPHY

B.S. Physics, Georgia Tech, 1973

Ph.D. Physics, University of North Carolina-Chapel Hill, 1979, with Eugen Merzbacher.

Visiting lecturer, Georgia Tech, 1980.

Humboldt Fellow, Freiburg University, Germany, 1981-82.

Joined the physics department at Cal State Fullerton, 1984; professor of physics, 1989.

Visiting professor of physics, Freiburg University, Germany, 1990.

Fellow of the American Physical Society, 1998, for contributions towards understanding the dynamical symmetries of the few-body Coulomb problem, particularly of electron pairs

Current research includes reaction imaging and information transfer with interferometry. A recent Phys Rev Letter describes the extraction of reaction amplitude phase using interferometers and monitoring information flow via momentum entanglement among reaction fragments. His research has been funded continuously by the DOE since 1986

Throughout my career, Feagin has been active in physics education and curriculum reform, and participated for example in the Introductory University Physics Project from 1993-95. He maintains a keen interest in computing throughout the curriculum and wrote Quantum Methods with Mathematica (Springer, 1994).

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## **Thomas N. Rescigno**

### **Physics Directorate, LLNL and Computing Sciences, LBNL**

#### **BIOGRAPHY**

Thomas N. Rescigno is a theoretical AMO physicist. He holds staff scientist positions at both Lawrence Livermore National Laboratory and Lawrence Berkeley National Laboratory. He received his B. A. (1969) from Columbia University and his Ph.D. in chemical physics from Harvard University. After a post-doctoral fellowship at the California Institute of Technology (1973-75), he joined the scientific staff at Livermore Lab. From 1979 to 1986, he was leader of the Theoretical Atomic and Molecular Physics Group and is currently a Senior Scientist. Since January, 2000 he has held a joint appointment at Berkeley Lab. He has also been a Visiting Scientist (1987 and 1991) at Los Alamos National Laboratory.

Dr. Rescigno is a Fellow of the American Physical Society (1988), where his service includes membership on the Executive Board (1997-2000) and Nominating Committee (2001-2002) for DAMOP and the Executive Committee for the Gaseous Electronics Conference (1998-2000). He currently chairs the APS Allis prize committee. He has also been a member of the Editorial Board of Physical Review A since 1995.

His research activities have concentrated on the dynamics of low-energy electron collisions with atomic and molecular targets and molecular photoionization. He pioneered the use of analyticity and complex scaling techniques in studying non-resonant electron collisions. His recent work has been focused on the three-body Coulomb problem where he and his coworkers have developed a computational approach that has provided the first complete, essentially exact, quantum mechanical treatment of electron impact ionization of atomic hydrogen.

#### **CANDIDATE'S STATEMENT**

"Few-body physics is a core discipline that is central to understanding a wide range of phenomena in many different areas of physics and chemistry and it continues to provide a wealth of intellectual challenges. Modern computational hardware and architectures, generally thought to be necessary to investigate the "complexity" of the physical world in the sense of investigating ever larger systems, are also having a profound effect on our ability to study fundamental few-body systems. The GFB is an important forum for the communication of ideas across traditional divisional boundaries through interdisciplinary dialogue. The challenge for GFB will be to avoid insularity and to convey the intellectual vigor and excitement of our activities to a broad scientific community."

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## CANDIDATES FOR EXECUTIVE COMMITTEE

### Lee Collins

#### Los Alamos National Laboratory

##### BIOGRAPHY

Lee Collins is a Laboratory Fellow at the Los Alamos National Laboratory, where he has been a staff scientist since 1977. He received a Ph.D. degree in Physics from Rice University in 1975. Editorial positions and honors include: Specialist Editor for Computer Physics Communications (1983-1991); Editorial Board Member (1991-1994) and Associate Editor (1994-present) of Physical Review A; APS Fellow (1995). He serves as Director of the Los Alamos Summer School (1992-present), a program aimed mainly at undergraduates, and as an Adjunct Professor at the University of New Mexico (1992-present). He has also been a member of the APS Fellowship and Nominating Committees of GFB, the Executive Committee of the Forum for Physics and Society, and the Education Committee of the Division of Atomic, Molecular, and Optical Physics.

His research has spanned a diverse set of areas including astrophysics; heavy-particle collisions; scattering of electrons from atoms and molecules; molecular structure; interaction of matter with radiation - photoionization, intense field interactions, and quantum control; computational physics; and quantum mechanical many-body treatment of dense liquids and plasmas as well as ultracold media.

##### CANDIDATE'S STATEMENT

The strength of the Topical Group rests with its interdisciplinary nature and its promotion of basic ideas across a diverse set of fields. This promotion has effectively occurred through the Newsletter, Webpage, organized symposia, prizes, APS Fellow appointments, and contacts through other organizations. These avenues should continue to receive vigorous support. Building on the success of the Spring Meeting symposia, we should increase our participation in joint endeavors at other divisional, national, and international meetings. We should also organize small, specialized meetings, apart from the large APS Conferences, that bring together a diverse set of researchers to address common problems that touch many fields. In addition, few-body problems play crucial roles in areas that might, at first, seem remote from the basic concerns of this Group such as plasmas, condensates, and materials. Extending contacts with relevant sub-fields of these disciplines could prove fruitful. Finally, actively participating in new APS education and public affairs initiatives aimed at broader expert and lay audiences might help further promulgate the multifaceted, fascinating nature of the few-body problem.

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## **Don Madison**

### University of Missouri/Rolla

#### BIOGRAPHY

B.A. (Mathematics), Sioux Falls College, 1967; Ph.D. (Physics) Florida State University, 1972; Postdoctoral Research Associate University of North Carolina (Eugen Merzbacher), 1972-74; Assistant, Associate and Professor of physics, Drake University, 1974-1984; Ellis and Nelle Levitt Professor of Physics, Drake University, 1984-88; Professor of Physics, University of Missouri-Rolla; 1988-98; Curators' Professor of Physics, University of Missouri-Rolla, 1998-present;

Visiting Scientist, University of Manchester, 1984; Visiting Scientist, Flinders U. of South Australia, 1988; Visiting Scientist, Institute of Theoretical Physics, Santa Barbara, 1991; Director of the Laboratory for Atomic, Molecular and Optical Research, University of Missouri-Rolla, 1999-present;

Fellow of the American Physical Society, 1993; President of TAMOC, 1994-1998; DAMOP Program Committee, 1994-1997; US Organizer for joint US-Australia Workshop, 1995; Organizer of DAMOP Undergraduate Research Competition, 1994-2000; APS Committee on Education, 1997-1999; DAMOP Committee on Publications, 1996-1999; DAMOP Education Committee, 1999-2002; ICPEAC general committee, 1999-2003;

International Chair for "The International Symposium on (e,2e), Double Photoionization and Related Topics"; 1999-2001; International Chair for "Eleventh International Symposium on Polarization and Correlation in Electronic and Atomic Collisions", 1999-2001; Organizing committee for 13 different International meetings. Research Interests: Perturbative and non-perturbative approaches to atomic scattering theory; Time-dependent scattering theory, Interaction of electrons, positrons and ions with atoms.

Currently Curators' Professor of Physics and Director of the Laboratory for Atomic, Molecular and Optical Research University of Missouri-Rolla

#### CANDIDATE'S STATEMENT

I learned scattering theory from nuclear books and papers in the late 60's and early 70's and have been working in AMO physics since. In spite of my best intentions, I have not managed to keep up with developments in other areas. On the other hand, it is inconceivable that my own work could not have benefited from advancements in related fields. For me, the primary appeal of the APS Topical Group on Few-Body Systems and Multiparticle Dynamics is to bring together people with similar interests from different specialties to provide both a forum for presenting the latest developments as well as for cultivating cross disciplinary collaborations. I think this is the strength of the forum and, if I were elected to the executive committee, I would support activities designed to promote and enhance this strength.

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## **Harold W. Fearing**

### TRIUMF

#### BIOGRAPHY:

Harold Fearing received his undergraduate degree from the University of Kansas in 1962 and his Ph.D from Stanford in 1967. He had postdoctoral positions at CERN, Stony Brook, Los Alamos, and Edmonton, moving to TRIUMF in 1975 when the Theory Group was formed. He is currently a Senior Research Scientist and Group Leader of the Theory Group at TRIUMF in Vancouver, BC.

His interests span a wide range of areas of few body, medium energy, nuclear and particle physics. In recent years the main emphasis has been on using chiral perturbation theory to evaluate simple processes. Other areas of interest include muon capture, bremsstrahlung, simple pion interactions, and more formal considerations dealing with weak and electromagnetic few body reactions.

He was organizer of the 12th International Conference on Few Body Problems in Physics, and has been on the International Advisory Committee of this series of conferences and of the Asia-Pacific Few Body conferences.

He is a Fellow of the American Physical Society.

#### CANDIDATE'S STATEMENT:

For me, the excitement of few body physics comes from the fact that the systems considered are simple enough that there is some hope of gaining fundamental understanding and at the same time the techniques are general enough to have application to a wide range of interesting areas and problems. An important goal of our few body group should be to try to convey that sense of excitement to our colleagues, but particularly to the young people entering the field.

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## **Greg Smith**

### **JLAB**

#### **BIOGRAPHY**

Greg Smith received his B. S. from the University of Minnesota (1974), and his M.Sc. (1976) and Ph.D. (1979) at the University of Colorado. He was a post-doc for the University of Karlsruhe at the Swiss Institute for Nuclear Physics (now PSI) from 1979-1984. From 1984-2000 he was a staff scientist at TRIUMF, and an adjunct professor at the University of British Columbia since 1990. Early in 2000 he moved to Jefferson Lab as a senior staff scientist.

His research interests at PSI and TRIUMF focussed on pion reactions using light targets, with particular attention to spin observables measured with polarized protons and deuterons. Later his emphasis shifted to the pion-nucleon system in the context of testing the predictions and measuring the parameters of chiral perturbation theory. The pion-nucleon sigma term and strange sea quark content of the proton were of special interest. To this end he served as group leader for the CHAOS collaboration at TRIUMF. At Jefferson Lab his interest in the proton's strange sea quark content continues through his involvement with the G0 parity violation experiment.

He has served on advisory committees for many conferences, including the MENU series and Chiral Dynamics

workshops. He was a member of local organizing committees for HYP94, the APS DNP97, and others. He organized and hosted the 7th International Symposium on Pion-Nucleon Physics and the Structure of the Nucleon (MENU97). He has served on the TRIUMF Computing Facilities Committee (1986-2000), the TRIUMF Long Range Planning committee (1992-1995), the TRIUMF Users Group (chair 1988), the TRIUMF Experiment Evaluation Committee (1988-1990), the LAMPF PAC (1991-1995), and the LAMPF Experimental Facilities Panel (1988-1991).

#### CANDIDATE'S STATEMENT

As our understanding of simpler systems improves, interest in the challenges of few-body systems has been on the rise. The cross-disciplinary aspect of few-body physics is but one of its attractive features. The APS can help raise the visibility of few-body physics by selecting the highest quality speakers for its meetings, and promoting topical meetings whenever possible. It is especially important to do this at venues where students and younger scientists are present in order to attract them into this discipline.

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## Larry Weinstein

### Old Dominion University

#### BIOGRAPHY:

Larry Weinstein received his PhD at MIT in 1988 and is now an Associate Professor at Old Dominion University in Norfolk, VA. He has studied Few Nucleon Systems for many years, starting with deuterium (e,e'p) response functions at the Bates Linear Accelerator Center and currently concentrating on  $^3\text{He}(e,e'X)$  with the CEBAF Large Acceptance Spectrometer at Jlab.

#### CANDIDATES STATEMENT:

Intermediate Energy Few Nucleon Physics has a problem. Despite recent tremendous advances in both experimental facilities and theoretical techniques, many physicists see it as a 'mature' (ie: boring) field. One symptom of this problem is the lack of theoretical calculations for many of the new Jefferson Lab experiments. I have recently organized the Jefferson Lab Few Body Group to help address this problem by improving communication between experimentalists and theorists and by trying to determine the exciting questions and opportunities in our field. I hope to continue and expand this effort through the APS Few-Body Topical Group.

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