

Topical Group on Few-Body Systems and Multiparticle Dynamics

Newsletter, March 2002

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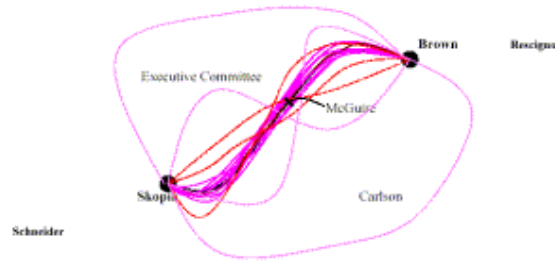
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MESSAGE FROM THE CHAIR

Action in our few body group

At times it seems like the evolution of our few body group is a balance between a razor sharp classical one true path and a freedom of quantum uncertainty. On the one hand there are the necessary functions of organizing talks for meetings, facilitating interactions between other areas of physics and few body physics in other countries, concerns of growth (or the lack thereof), sponsorship of new Fellows of the American Physical Society and good communication.

The recurring dream is to find a way to make something new and exciting happen -- i.e., stepping off the one true path far enough to find something both unpredictable and worthwhile.



Perhaps the most pressing before our group this year is the problem of our low membership. For several years the GFB membership has hovered a little above 300. If our membership drops below 300 we could lose our status as a topical group of APS and cease to exist. One consequence is that there would be no invited or contributes sessions at meetings of the American Physical Society. There would be no voice in APS for few body problems.

In consultation with Virginia Brown, our Chair-Elect, the GFB Executive Committee and Dennis Skopik, Past Chair, we have undertaken a number of efforts to attract new members. We have run announcements in the division of computational physics, astrophysics and atomic physics encouraging people to join GFB. We have contacted people whose GFB membership has lapsed. It appears that the most effective approach is personal contact. I have encouraged dozens of my colleagues to join. Some have, but we need more. I hope each of you will keep this in mind when you talk with colleagues who you think might like to have their work represented by GFB.

Virginia Brown, as Chair of the Program Committee, has worked on the organization of two invited sessions for talks for the Spring APS Meeting in Albuquerque April 20-23. One of these sessions, on Antimatter, is cosponsored with DAMOP. The other, on Challenges for Effective Field Theory, is cosponsored with DNP. I hope you will plan to attend these two sessions.

The business meeting will be held at the Albuquerque meeting. The time and location can be found at the meeting. I encourage each of you to attend and to participate. There is money in our FGB treasury that can be used to promote the kind of physics we do, or to help increase our membership, or to support a creative idea. Please bring us some suggestions.

I would like to thank those listed below for their service on the various committees of our topical group, as well as Charlotte Elster, who maintains our GFB website. Their time and effort enables recognition of the work done in few body physics.

Finally, we congratulate Charlotte Elster and Craig Roberts, who were in the year just past chosen from the GFB for Fellowship in the American Physical Society.

-- Jim McGuire

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ELECTIONS --- ELECTRONIC VOTING

Enclosed is your ballot for our 2002 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 beginning May 2002.

Adam Sarty and Rocco Schiavilla are the candidates for Vice Chair. Candidates for the Executive Committee are Daniel Phillips, Mike Cavagnero, Roxanne Springer, and Joe Macek.

Brief biographies and statements of the candidates are given below.

The present officers are Dennis Skopik, Past-Chair; Jim McGuire, Chair; Virginia Brown, Chair-Elect; Tom Rescigno, Vice-Chair; Carl Carlson, Secretary-Treasurer. The current Executive Committee members (and the years their terms expire) are: Lee Collins (04), Harold Fearing (04), C. William (Bill) McCurdy (03), Wayne Polyzou (03), Bunny Clark (02), Eric Heller (02).

You may vote electronically by going to Web Site

<http://www.physics.wm.edu/~carlson/ballot02.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/) 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

Charlotte Elster and Craig Darrian Roberts were elected to Fellowship in the APS under the wings of the GFB last year. Congratulations to both of them. Elster's fellowship citation read "*For her significant contributions to the understanding of the nucleon-nucleon interaction and its applications in few-body systems and nuclear reactions.*" Roberts's citation read "*For significant contributions to continuum modeling of QCD for hadron physics, linking both quark-gluon confinement and dynamical chiral symmetry breaking with light meson observables*"

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APRIL MEETING

The APS April Meeting will be held from April 20-23, 2002 in Albuquerque, New Mexico.

At the Spring meeting we are co-sponsoring two sessions. One of these, on Antimatter, is cosponsored with DAMOP.

The other, on Challenges for Effective Field Theory, is cosponsored with DNP. Members are urged to keep abreast of the latest developments via the APS Webpages and other APS announcements.

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GORDON CONFERENCE ON PHOTONUCLEAR REACTIONS

There is not currently a Gordon Conference on Few Body Problems. (You might drop a note to GFB Vice-chair Tom Rescigno if you think such a conference would be a good idea.) However, there is a Gordon Conference on Photonuclear reactions that will be of interest to much of our membership.

The Gordon Conference on Photonuclear Reactions is scheduled to take place at the Tilton School in Tilton, NH, August 18-23 2002. Betsy Beise, Daniel Phillips, and Hans-Jurgen Arends are the co-chairs.

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CANDIDATES BIOGRAPHIES AND STATEMENTS

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CANDIDATES FOR VICE-CHAIR

Adam J. Sarty

Saint Mary's University

BIOGRAPHY

Adam Sarty received a B.Eng.(Engineering Physics) in 1987, and a Ph.D. (Physics) in 1993, both from the University of Saskatchewan in Canada. After a post-doctoral position with the Laboratory for Nuclear Science at the Massachusetts Institute of Technology, he held an Assistant Professor position in the Department of Physics at Florida State University from 1996-2000. He has been at his current position as Associate Professor in the Department of Astronomy & Physics at Saint Mary's University in Halifax, Canada, since August of 2000.

Dr. Sarty's research program has been split between studying the details of the meson-nucleon description of few-nucleon systems (deuteron, Helium-3 and Helium-4), and studying the nucleon-to-Delta transition with an eye to understanding low-energy structure issues of the few-quark system. His work has entailed photodisintegration and coincident electron scattering experiments at four laboratories - the Saskatchewan Accelerator Laboratory, the MIT-Bates Linear Accelerator Center, the Mainz Microtron MAMI, and Jefferson Lab.

The focus on experiments testing the most current theoretical predictions for reactions on few-nucleon systems stems from earlier work at the lower energy facilities, with the paradigm shift to probing structure in terms of constituent-quark degrees-of-freedom emerging naturally from the higher available energy of Jefferson Lab. With the nature of this paradigm shift representing the heart of many Jefferson Lab research efforts, Dr. Sarty's program of measurements attempts to assist in the quest through providing structure-testing experiments from both sides of the issue.

Dr. Sarty has held leadership positions within two large experimental collaborations. He was Coordinator of the Out-of-Plane Spectrometer ("OOPS") Collaboration at the MIT-Bates Accelerator (1998-99), and has served on the Coordinating Committee for the Jefferson Lab Hall A Collaboration since 2000 (Chair of Committee since 2001). He also served as an elected member of the Bates Linear Accelerator User Group (1995-99) in capacities as Treasurer and Vice-President. This candidacy represents the first venture into serving the APS.

CANDIDATE'S STATEMENT

"In the area of few-body nuclear physics, years of effort from the theoretical community has led to our current situation in which full, exact solutions to reaction dynamics - based on iterating realistic NN potentials - are now possible. But the journey has been difficult: there remain only a small core of practitioners with this expertise, and these few are called on to support a host of experimental efforts. Nevertheless, these modern calculations are poised to put to the test our understanding of few-nucleon systems at a fundamental level in terms of our best NN potentials. This, however, points to one further

complication of this issue:

such theories are most often restricted to energies lower than what is typical of the new experimental facilities.

The combination of this attrition from the theory community, and the growing disconnection between theory and experiment in the area of few-nucleon physics can (and must) be tackled by this Topical Group. We need to continue vigorous efforts to inform and advertise to the community at large the untapped potential of our work. It should continue to be one of the primary goals of the Few-Body Topical Group to stimulate interest in young researchers to consider few-body dynamics as a viable path. For my own part, I co-organized and hosted a Workshop this past summer ("LOWq: Workshop on Electromagnetic Nuclear Reactions at Low Momentum Transfer", see www.ap.stmarys.ca/LOWq/) which ultimately focused considerable attention to the potential discoveries related to tests of modern few-nucleon theories.

"Beyond few-nucleon physics, few-body quantum systems in general continue to hold themselves out as rich systems.

When I was a postdoc, I attended a Few-Body Gordon Conference and was struck by the cross disciplinary nature of the Conference - and the fact that the similarities were so strong between areas. It was a direct result of experiencing this Gordon Conference that I chose to continue my study of few-nucleon systems and indeed expand to the nucleon (few-quark) system, seeing then more of the similarities of approach than the differences.

Although this is my first venture into serving the APS, I hope that I can play a role because of my commitment to this area of study - and my hope that I can influence other young researchers to make this same commitment, as I chose to do after that Gordon Conference."

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Rocco Schiavilla

Old Dominion University and Jefferson Lab

BIOGRAPHY

Rocco Schiavilla received his Laurea in Physics, summa cum laude, from the University of Pisa in 1981, and his Ph.D. in Theoretical Nuclear Physics from the University of Illinois at Urbana-Champaign in 1987. Schiavilla was a post-doctoral associate in the Division de Physique Nucleaire et Haute Energie of Saclay, France, from 1987 to 1988, and in CEBAF (now TJNAF), Virginia, from 1988 to 1990, when he was awarded the Enrico Fermi scholarship at Argonne National Laboratory, 1990-1992. After a brief stint at the Istituto Nazionale di Fisica Nucleare in Lecce, Italy, from 1992 to 1993, he returned to Virginia where he accepted a joint position as a Staff Scientist in the Theory Group of TJNAF and as an assistant professor in the Physics Department of Old Dominion University. Currently, Schiavilla is Senior Staff Scientist, TJNAF, and Associate Professor, Old Dominion University. His research interests, so far, have been in the physics of few-nucleon systems, particularly their electroweak structure and response.

CANDIDATE'S STATEMENT

"In my view, three aspects uniquely characterize few-body physics: i) the close inter-dependence, and consequent mutual re-enforcement, between theory and experiment; ii) the multi-disciplinary character of the applied methods, encompassing different sub-fields of physics, from atomic and molecular to nuclear and hadronic physics; and iii) the rapid evolution of computational techniques and facilities, which is in fact constantly re-defining the meaning of "few" in few-body systems. The Topical Group on Few-body Systems and Multiparticle Dynamics should emphasize and promote, in its meetings and sessions, these three key

features."

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CANDIDATES FOR EXECUTIVE COMMITTEE

Daniel Phillips

Ohio University

BIOGRAPHY

Daniel Phillips is currently an Assistant Professor in the Department of Physics and Astronomy at Ohio University in Athens, Ohio. Daniel got his B. Sc. (with Honours) in 1991 from the Flinders University of South Australia. He stayed at Flinders to do his Ph. D., where he worked with Professor Iraj Afnan on coupled equations for systems of nucleons and pions. In 1995 he took a post-doctoral position at the University of Maryland where he did theoretical work on electron-deuteron scattering, Compton scattering on deuterium, and issues to do with the application of effective field theory to light nuclei. This work on effective field theory continued at the University of Washington, where he was a Research Assistant Professor for two years. While in Seattle he also began research on improving the input physics for neutron-star and supernova simulations. In 2000 he assumed his current position at Ohio University. He is co-chair of the 2002 Gordon Research Conference on Photonuclear Reactions.

CANDIDATE'S STATEMENT

The study of few-body systems is almost as old as physics itself. Few-body problems such as the Earth-Moon-Sun problem and the application of Bohr's model to the Helium atom have played a key role in new developments in physics. In part this is because such problems are often the simplest soluble systems in which moderately complicated dynamics can occur. For this reason, work on few-body systems will continue to be an important area of research.

Thus the richness inherent in the study of few-body systems is not just historical. Research topics from Chemistry, Computer Science, Mathematics, and Physics all fall under the aegis of the FBSTG. The chance to learn and use techniques from other disciplines is one important advantage of the existence of a group such as this. Meanwhile, the interplay of experimental and theoretical results is another thing that makes this an exciting research area. Few-body theorists generally work on problems of relevance to experiment, since it is the immediacy of experimental tests of our theoretical predictions that attracts many of us to the field. And experimentalists know that careful experiments will provide genuine tests of theoretical models, since theorists can perform precise calculations of few-body system observables once a particular model is specified.

I believe that the FBSTG should draw on these strengths in planning meeting programs and pursuing outreach. We should seek to convey to others the excitement of work in the few-body field. At the same time we should meet together regularly in order to foster a community where theorists and experimentalists working in different sub-fields, or even different disciplines, and engaged on research on different problems, can challenge, stimulate, and educate each other.

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Mike Cavagnero

University of Kentucky

BIOGRAPHY

Michael Cavagnero received a B.S. degree from the University of Connecticut (1981) and M.A. (1984) and Ph. D. (1987) degrees from the University of Chicago. After post-doctoral positions at the University of Nebraska (1987-1989) and at JILA (1989-1990), he joined the University of Kentucky faculty (1990). He was appointed an ITAMP Visiting Scientist in 1997-1998, served as Secretary of the Theoretical Atomic, Molecular and Optical Community for 3 years, and is a Fellow of the APS.

He has served as a "house-theorist" at the University of Kentucky with primary focus on aiding experimental explorations into the dynamics of Rydberg atoms in collisions and fields. He has also studied a number of aspects of the non-relativistic few-body problem, with emphasis on the role of correlations induced by long-range interactions.

CANDIDATE'S STATEMENT

Many of the important new advances in physics are arising at the boundaries between traditional disciplines and so benefit substantially from cross-disciplinary workshops and symposia. The GFB has traditionally played a constructive role in fostering such contact. I would like the GFB to continue to promote interaction between theorists and experimentalists in these exciting fields by focusing meetings and sessions on topics of current experimental interest in interdisciplinary fields. I suspect that this strategy will aid in growing the GFB by re-emphasizing its relevance to current issues in science.

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Roxanne Springer

Duke University

BIOGRAPHY:

Roxanne Springer received a Bachelor's degree in both physics and chemical physics from Rice University in 1985.

She received her Ph.D. in theoretical particle physics in 1991 from the California Institute of Technology and was a visiting assistant professor at the University of Wisconsin-Madison from 1990-2. In 1992 she accepted an assistant professor position at Duke University, and received tenure in 1999. She was a member of the Program Committee for the Division of Nuclear Physics in the APS from 1996-8 and Vice President of Duke University's Phi Beta Kappa Chapter from 1996-7. In 1998 she was co-organizer of the Institute for Nuclear Theory's "The Physics of Strangeness" program.

Her research interests are the application of effective field theory techniques to particle and nuclear physics. In particular she uses and develops effective theories based on the symmetries of QCD and weak interactions expressed in the language of hadrons.

Calculations using these EFTs can then be compared to experimental results. From this we can obtain, for instance, an extraction of important parity violating constants, or discover how the symmetries of QCD govern electromagnetic decays of the Ω^- baryon, or dictate the behavior of deuterons.

CANDIDATE'S STATEMENT:

We have seen some very exciting advances recently in the interplay between few body systems and effective field theories (EFTs) of nuclear and particle physics.

EFT techniques have important applications in FBS and FBS techniques broaden the reach of EFTs. With the nurturing of the interaction of these two subfields, I think that we will be able to understand few body systems on an increasingly fundamental level (e.g., QCD-based in the case of light nuclei, and short-distance behavior in the case of Bose-Einstein condensation).

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Joe Macek

Tennessee

BIOGRAPHY

Joseph Macek holds the joint position of Distinguished Professor, University of Tennessee and Distinguished Scientist, Oak Ridge National Laboratory.

He received his Ph.D. in 1964 from Rensselaer Polytechnic Institute, was a National Research Council Postdoctoral Fellow at the National Bureau of Standards in Washington, D. C. from 1964-66, a joint Oxford-Harwell fellow from 1966-68, and came to the University of Nebraska in 1968. In 1988 he took his present position at the University of Tennessee.

He is a fellow of the American Physical Society.

His research centers on the structure and dynamics of few-body atomic systems and on developing techniques to compute processes involving three-body final states. An important goal of this work is realistically incorporate effects of long-range interactions in atomic, molecular, and nuclear processes since novel structures in reaction cross sections often relate to such interactions.

CANDIDATE'S STATEMENT

The main stream of physics research has shifted away from fundamental issues that are at the core of research in few-body interactions towards applications which often relate to collective interactions of many particles. Few-body physics plays an important role in these systems and the Few-Body Topical Group should communicate the importance of their understanding to the wider community through close cooperation with other topical groups and divisions of the American Physical Society.

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