

## GFB NEWSLETTER 2015 Edition

Dear members,

This newsletter describes the current activities of the APS Topical Group on Few-body Systems and Multi-particle Dynamics. As of mid-March the group had over 320 members. We have been very active over the past year. We undertook to organize—jointly with the Group on Precision Measurements and Fundamental Constants—a workshop at this year's April meeting in Baltimore, MD. We also have an unprecedented level of involvement in this year's International Conference on Few-body Problems in Physics. Read on! And find out about these, and other, ways in which we are serving the Few-body Community.

With my best wishes,

Daniel Phillips  
Chair

### 2014 GFB Fellows

We are delighted that two excellent researchers have been awarded APS fellowships through GFB. They are Dean J Lee, from North Carolina State University and Laura E. Marcucci from University of Pisa.

Dean's fellowship citation is: "For the development of lattice effective field theory as a novel approach to the nuclear few- and many-body problem, and for applications of this technique to the structure of the Hoyle state".

Key paper:

*Ab initio* calculation of the Hoyle state

E. Epelbaum, H. Krebs, D. Lee, U.-G. Meißner

Phys. Rev. Lett. 106, 192501 (2011).

<http://journals.aps.org/prl/abstract/10.1103/PhysRevLett.106.192501>

For more information about Dean, see <http://www4.ncsu.edu/~djlee3>.

Laura's fellowship Citation is: "For advancing the understanding of electroweak interactions in nuclei, particularly for precise studies of low-energy radiative and weak capture processes of astrophysical relevance in the few-nucleon systems."

Key papers:

Chiral Effective Field Theory Predictions for Muon Capture on Deuteron and  $^3\text{He}$

L. E. Marcucci, A. Kievsky, S. Rosati, R. Schiavilla, and M. Viviani

Phys. Rev. Lett. 108, 052502 (2012);

<http://journals.aps.org/prl/abstract/10.1103/PhysRevLett.108.052502>

Realistic Calculation of the  $^3\text{He}+p$  (hep) Astrophysical Factor

L. E. Marcucci, R. Schiavilla, M. Viviani, A. Kievsky, and S. Rosati

Phys. Rev. Lett. 84, 5959 (2000).

<http://journals.aps.org/prl/abstract/10.1103/PhysRevLett.84.5959>

For more information about Laura see <http://pisatheorygroup.pi.infn.it/home>.

This is the first time for several years that GFB has had two Fellows. This is partly a result of our increased membership. But I must also acknowledge the work of the GFB Fellowship Committee, which vetted the fine nominations we received, and secured this outcome. The committee was: Chris Ticknor (Los Alamos, Fellowship Committee Chair), Ann Orel (UC, Davis & NSF), and Hans-Werner Hammer (TU, Darmstadt).

### **2015 GFB Fellows: nominations open**

If you know of a GFB member who you feel is deserving of APS Fellowship we encourage you to nominate them for this distinction through the Topical Group.

Attracting and serving a diverse and inclusive international membership is an important goal of the APS. We especially encourage nominations of women, members of underrepresented minority groups, and scientists working outside the U.S.

[Fellowship Information »](#)

[Nomination Requirements »](#)

*This year the deadline for submission of nominations is Monday, June 1, 2015.* If you have questions about fellowship nominations and/or selection please contact the Chair of the GFB Fellowship Committee, Ricardo Alarcon, [ricardo.alarcon@asu.edu](mailto:ricardo.alarcon@asu.edu). The other members of the committee this year are Silas Beane (University of Washington), James P. Colgan (Los Alamos), and Janine Shertzer (Holy Cross).

### **April meeting: GFB Sessions**

This year's April meeting of the American Physical Society (APR15) will take place in Baltimore, MD, from April 11-14. This year GFB will host two invited sessions:

#### B8. Search for New Physics with Atoms, Molecules, and Nuclei

(in partnership with GPMFC)

Speakers are: D. Budker (Mainz), J. Doyle (Harvard), W. Haxton (Berkeley)

#### U11. Correlated Fermions in Nuclei and Ultra-Cold Atomic Gasses

(in partnership with DNP)

Speakers are: N. Barnea (Herbrew University, Jerusalem), M. Sargsian (Florida International), L. Weinstein (Old Dominion)

Session M15 will contain contributed talks on Few-body Physics.

I want to thank Chris Ticknor (GFB program chair), Sonia Bacca (TRIUMF), and Jerry Feldman (George Washington) for putting together this excellent set of talks.

### **Joint workshop with GPMFC on Tests of Fundamental Symmetries**

On Friday April 10 we will host a workshop—jointly with the Topical Group on Precision Measurements and Fundamental Constants—in the same venue as APR15. The workshop will take place in the same venue as APR15. Nine invited speakers will give talks that Friday, and the workshop will continue with the talks in Session B8 (see above) on Saturday morning. A number of prominent speakers will present forefront results on searches for electric dipole moments and measurements of parity violation. The talks will showcase results from both the atomic-physics and nuclear/particle-physics communities. There will also be a poster session late on Friday at which attendees can present their own work to the community.

Please check the [workshop website](#) for more information. Any questions regarding the workshop can be sent to [workshopTFS15@gmail.com](mailto:workshopTFS15@gmail.com).

### **GFB at DAMOP**

The annual meeting of the APS Division of Atomic, Molecular, and Optical Physics will take place in Columbus, Ohio from June 8-12. The GFB Executive Committee decided we should try to raise our profile at the annual DAMOP Meeting. To that end, Chris Ticknor, Klaus Bartschat (Drake) and Michael Schulz (Missouri University of Science and Technology) proposed several sessions for that meeting which had a GFB flavor. The following GFB sessions will take place in Columbus in June:

#### J8: Invited Session: Few-body Experiments and Theory

Speakers are: C. Regal M. Weidenmuller, D. Blume, M. Parish

Session C3 will contain contributed talks on “Few-body physics in cold atoms”.

### **GFB Travel Awards**

GFB once again sponsored its annual travel awards, in order to facilitate the travel of young scientists to DAMOP and the April meeting. This year’s awardees are:

- Cody Parker, Ohio University, APR15, Title: “The  $3\text{H}(d,\gamma)$  Reaction at  $E_{c.m.} \leq 300$  keV”
- Su-Jun Wang, Purdue University, DAMOP, Title: “Search for Efimov trimers in ultracold atomic mixtures in the presence of spin-orbit coupling”

Congratulations to Cody and Su-Jun! The selection committee was Ricardo Alarcon (Arizona State) and Chris Ticknor. Particular thanks to Mohammad Ahmed of North Carolina Central University and the Triangle Universities Nuclear Laboratory, who hosted the website through which members applied for these awards.

### **2015 GFB elections**

The election of a new Vice-Chair and two new members of the Executive Committee is ongoing. This year’s Nominating Committee was chaired by Doerte Blume, and included Viatcheslav Kokoouline (Central Florida), Lucas Platter (Tennessee), and Michael Schulz (Missouri Science & Technology). They recruited an excellent slate of candidates from the AMO community. This ensures that the Executive Committee reflects the way in which the Topical Group crosses different sub-fields of physics.

For Vice-Chair the candidates are Tom Kirchner (York University) and Svetlana Kotochigova (Temple). Jose d’Incao (JILA), Robert Forrey (Penn State, Berks), and Philip Johnson (American) are standing for Executive Committee. Thank you to all who are standing for election. The two new Executive Committee members will replace Agnieszka Jaron-Becker and Klaus Bartschat, who have reached the end of their three-year terms.

*If you have not yet voted please do so soon; the election closes on April 15.* I realize many of you who are not from the AMO community may not know the candidates personally. However, the APS believes election “turnout” reflects upon the health of the group, so please do examine the candidate bios and statements and consider casting a vote.

### **GFB Officers and Executive Committee**

At present the full leadership team of GFB is:

*Chair:* Daniel Phillips  
*Past Chair:* Doerte Blume  
*Chair Elect:* Chris Ticknor  
*Vice Chair:* Ricardo Alarcon  
*Secretary/Treasurer:* Charlotte Elster  
*Executive Committee:* Agnieszka Jaron-Becker (2015)  
Michael Schulz (2015)  
Sonia Bacca (2016)  
Jerry Feldman (2016)  
Klaus Bartschat (2017)  
Matthias Schindler (2017)

### **The 21st International Conference on Few-body Problems in Physics**

The 21st International Conference on Few-body Problems in Physics (FB21) will take place in downtown Chicago from May 18-22 this year. It is jointly organized by Argonne National Laboratory and Ohio University. This series of conferences has a long tradition, that dates back to 1959. The most recent (FB20) was held in 2012 in Fukuoka, Japan. The meeting will discuss problems that can be understood in terms of a few effective degrees of freedom in areas including, but not limited to: atomic and molecular physics, few-nucleon systems, hadronic physics, and cluster models of heavier nuclei. The program reflects the broad scope and interconnectedness of contemporary few-body physics, and gives due representation to both experiment and theory in these areas.

GFB will host a reception at the meeting in conjunction with the Tuesday-afternoon poster session. If you are at FB21 stop by the GFB table and say “Hello”! And if you have not yet made plans to attend, why not consider coming? Full details are available at [the conference website](#).

GFB also sponsored five awards of \$500 apiece to help defray the expenses of junior scientists attending FB21. There was a very strong response with the FB21 Organizers receiving fifteen applications for support. Those selected to receive a grant were: Giorgios Laskaris (Duke), Amy Lovell (Michigan State), Maria Piarulli (Old Dominion), Jorge Segovia (Salamanca), and Yangqian Yan (Washington State). Again, the organization of these awards was only possible thanks to the technical skills and hard work of Mohammad Ahmed, who set up a separate website at which people could apply for these FB21 Travel Grants.

### **Membership and Mission**

The number of GFB members determines, among other things, both the number of invited sessions we can sponsor at the APS April meeting and the number of candidates the GFB can advance for APS Fellowship in any given year. As noted above, right now we have a little over 320 members. It would be good to add to this number. Please encourage your friends who do few-body physics to join the group. It only costs \$8! And a substantial fraction of that comes back to GFB to fund activities like the travel awards and workshops described above. Students can make GFB one of their “two free units” when they join APS—and APS membership is free for them for the first year. So if you are working with students or post-docs please also encourage them to join the Group.

In order to aid our recruitment efforts Matthias Schindler, (South Carolina), Agnieszka Jaron-Becker (Colorado), and other members of the leadership team updated the [GFB website](#). We also came up with a one-line statement of GFB’s mission. It is: “To advocate, promote, and advance research on few-body systems”.

I am just returned from a symposium on Efimov Physics at the DPG spring meeting in Heidelberg. There I was reminded of how few-body physics sits at the intersection, not only of AMO and nuclear physics, but also of fundamental theories (e.g. QCD) and many-body dynamics (e.g. in the unitary gas). The Topical Group will continue to foster interactions which enhance the opportunities for such intersections to lead to exciting progress in physics.

As always, if you have any questions about any of GFB's activities, or suggestions for other ways in which the group could serve the community, please don't hesitate to contact me by email, [phillid1@ohio.edu](mailto:phillid1@ohio.edu), or phone (+1)740-593-1698.