

International Conferences and Workshops

Emergent Quantum Phases in Condensed Matter – from topological to first-principles approaches (EQPCM2013)

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In condensed matter theory, a variety of collective phenomena emerging in real materials are often explained or predicted first in terms of effective models, and then the description is made more precise with first-principles calculations based on the *ab initio* Hamiltonian. These two approaches require different backgrounds and are in many instances pursued separately. However, given the rapid progress in the both approaches and a rich variety of novel quantum phenomena found in recent years, bridging between the two is important more than ever. This Workshop/Symposium was organized in order to facilitate such an exchange with interactions among active theorists with diverse backgrounds.

During the Symposium period (June 12-14, 2013), results from the frontline of research, including experimental works, were reported in 33 talks and 47 poster presentations. The “hot” topics at the Symposium included Skyrmions in magnetic materials, transport in topological insulators, electron correlations in topological insulators, quantum spin ice, quantum spin liquids, and quantum entanglements in topological phases. The cumulative total attendance of the three-day symposium reached 351, indicating the success in attracting people from different fields.

The rest of the program was designated as the Workshop period. Typically, each day of the Workshop started with a 90-minute pedagogical lecture in the morning, followed by two 30-minute talks in the afternoon mostly by junior scientists. This format was conceived in order to stimulate exchanges among scientists with different backgrounds, and to encourage junior scientists. In fact, the ample free time between and after the talks was filled with lively informal discussions. During the Workshop period, there were 14 pedagogical lectures and 20 30-minute talks. The pedagogical lectures reviewed fundamentals of current topics and covered both effective-model based and first-principles approaches. They were particularly useful for the

participants to become acquainted with unfamiliar concepts and methods. The 30-minute talks by junior scientists were of surprisingly high quality, demonstrating the high standards of young generation in the emerging fields.

This Workshop/Symposium was sponsored by ISSP, as well as Computational Materials Science Initiative of Japan, Elements Strategy Initiative Center for Magnetic Materials, Grant-in-Aid for Scientific Research on Innovative Areas “Topological Quantum Phenomena in Condensed Matter with Broken Symmetries”, and Institute for Complex Adaptive Matter (ICAM-I2CAM, NSF Grant DMR-0844115). The program and other details of the Workshop/Symposium can be found at the web page <http://www.issp.u-tokyo.ac.jp/public/EQPCM/>



The 2nd DYCE-Asia and ISSP-international Workshop on Life Science and Photonics

December 17-18, 2013
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As the first ISSP international workshop on life science, the 2nd DYCE-ASIA workshop on “Life Science and Photonics” was held at Media Hall, Kashiwa Library, in Kashiwa Campus of The University of Tokyo. It was planned as an interdisciplinary scientist meeting of life scientists, physicists, and semiconductor photonics engineers. In this workshop, interesting recent topics including (1) bio-imaging for science and medical applications, (2) spectroscopy of bio-related materials, and (3) bioluminescence science and applications, were presented. About 60 people attended the workshop, including invited 15 speakers mainly from Asia-Pacific economies. Each speaker gave plain introduction to non-specialist audiences.

Life science and photonics are both very rapidly growing fields in this century, and we need to enhance mutual understanding and interactions among scientists in these fields. Moreover, these fields should lead near-future economy growth. Indeed, industrial developments related to photonics science are recently very active particularly in Asia-Pacific economies/countries. Therefore, this workshop was organized as the 2nd DYCE-ASIA workshop: DYCE (Optical science of dynamically-correlated electrons in semiconductors) was the title of a joint-research program from November 2008 to March 2013, supported via KAKENHI, or Grants-in-Aid for Scientific Research on Innovative Areas, by MEXT, Japan. The DYCE-ASIA workshop was started in order to extend the domestic DYCE research in Japan to Asian and international economies/countries.

The 2nd DYCE-ASIA workshop was officially supported by and organized as a project of Asia-Pacific Economic Cooperation (APEC), because the above-mentioned aims of the DYCE-ASIA workshop exactly match the goals of Policy Partnership on Science, Technology and Innovation (PPSTI) in APEC. This workshop was financially supported by KAKENHI grant (No. 20104001) and ISSP.

We got many thankful comments from foreign attendants as shown below.

— Thank you for the excellent work organizing the II DYCE and hosting at Todai. The workshop was very well organized and interesting. As for me, I had the opportunity to present my work and see and discuss the work of other researchers interested in solving the mechanism of bioluminescence colors. I also had the opportunity to see other interesting works about bio-photonics, of special interest were the technologies dealing with fluorescence imaging and microscopy, and to interact with researchers from other areas. Finally, I wish to thank the opportunity to see state of the art laser technologies in your labs. I hope in the near future to host a workshop or advanced school of bioluminescence in Brazil.

— Thank you so much indeed for the invitation. I enjoyed taking part in the Workshop. I love Japan very much and I am very happy every time visiting your so nice and beautiful country. As for the Workshop, I believe that the in general its quality was good. It was helpful in many senses (for me, at least). The program was interesting, the quality of presentations was fine, the number of participants was about right. The minor problem for me was the accommodation. The air conditioner (the heater) in my room was awful. Very noisy and without auto temperature control. I hope that the University will replace air conditioners for modern ones in the near future. Anyway, I enjoyed very my visiting you and hope to see you soon.

— The workshop was extremely well organized. All the invited speakers are very knowledgeable and they are in the top of their scientific fields. I tremendously learnt a lot from these 2 days workshop. Very focused topics! The poster session has also brought a different flavor to the workshop as we had more time to scientifically discuss with each individual. My overall impression is very positive about the work and I would love to participate in the next DYCE if possible. Please keep up the good work.

— Many thanks for your organizing such a wonderful event. I have been back to Taipei on last Thursday. Please kindly consider the development of 1300 nm femtosecond laser light, which would be very useful for clinical imaging.

— Thanks for your nice organization and warm hospitality during the 2nd DYCE-Asia. The topic of "Life Science and Photons" is very interesting and reflects the hot application trend of laser technologies. Although the conference is of a small



scale, it attracts the most important researchers in this field and in the world. Such a conference is definitely important to Asia researchers. I enjoyed it very much. I think such a topic-limited conference is very good and should be continued in the future.

— I'd like to thank you again for your kind arrangement of the 2nd DYCE workshop and the lab tour, and the nice dinner for six of us together. As a beginner, I learned a lot from our speakers about life science /firefly and the status of 1300nm microscopy. I discussed with several DYCE members and possibly some further collaboration work in the near future. I think (at least for Taiwanese participants): we can cover the air fees to Japan to reduce the financial loading of the DYCE program. The guest house at U. Tokyo is very nice and convenient. Thank you for everything.

— I would like to thank you for the kind invitation and the warm welcome in the University of Tokyo. It was great meeting you and the other colleagues that work on bioluminescence. I would like to reiterate that I am very interested in starting collaboration with your group. I will re-read your latest excellent publications and I will come up with some proposals on how we can complement our expertise.

— Overall, the symposium is of very high quality and efficient. A collection of frontier technologies, results, and ideas is presented in the symposium. The results on bioluminescence are particularly interesting. It reflects the outreaching effort of the excellent team. The team and related scholars have achieved tremendously in various photonics technologies, especially on novel light sources. As shown in the abstract book, the topics are well selected. The participating scholars also did a great job in presenting their work. The meeting venue is located in the library and next to on-campus cafeteria. The arrangement is very practical and efficient. The lab tour is rather impressive. It takes resources, intelligent and dedicated scholars, creativity and relentless efforts to build up such a world class laboratory, as shown in the tour. It shows Japan can definitely lead the world in realizing frontier ideas with cutting edge technologies. Last, but not the least, the interaction among the participants is most warming and rekindling. Behind the excellent works, there are so many details that are often left out from the official presentation. The coffee breaks and the get-together lunches and dinners nicely fill the gap on behind the scene stories and allow the building of friendship. In the next workshop, participation of more graduate students is highly encouraged. The logistics is also excellently done, simple and effective.

