

C5 Activity Report for the IUPAP Council and Commission Chairs Meeting October 2019-October 2020

Officers/Members 2017-2020

Chair	William P. Halperin	USA
Vice-Chair	Pertti Hakonen	Finland
Secretary	Naoto Nagaosa	Japan
Members:	Xianhui Chen	China
	Juhn-Jong Lin	Taiwan
	Hermann Suderow	Spain
	Viktoria Bekeris	Argentina
	Maxim Kagan	Russia
	Philipp Gegenwart	Germany
	Richard P. Haley	UK
	Peter Skyba	Slovakia
	Floriana Lombardi	Sweden
	Ok Hee Chung	Korea
	Pratap Raychaudhuri	India
Assoc. Mem.	Darius Kaczorowski	Poland

Activity Report

This review covers the period October 2019 – October 2020 with a summary of the immediate previous 12 month period.

1.0 Activity Previous Period April 2018 – October 2019

1.1 Conferences Organized and Endorsed

Type B

QFS2018, International Symposium on Quantum Fluids and Solids, July 25-31, Tokyo, Japan. This conference was held on the Hongo campus of the University of Tokyo, Ito Center. It was the 23 regular conference in the series on Quantum Fluids and Solids dating back to 1975 in various countries Czech Republic(1), France(2), Germany(1), Italy(1), Japan(3), Russia(1), UK(1), USA(13) in Europe, Asia, and the Americas. For QFS2018, there were 255 registrants, 52 invited talks, and 147 poster presentations with four prizes for best posters. The conference organizers were *Conference Chair*: Hiroshi Fukuyama (Univ. Tokyo), *Conference Vice-Chair*: Makoto Tsubota (Osaka City Univ.); *Organizing Committee*, Hiroshi Fukuyama (chair), Makoto Tsubota (vice chair), Seiji Higashitani, Koichi Matsumoto, Shinichi Ohkoshi, Yutaka Sasaki, Keiya Shirahama, Masaru Suzuki, Takeo Takagi; *Program Committee*, Makoto Tsubota (chair), Hiroki Ikegami, Takeshi Mizushima; *Publication Committee*: Takeo Takagi (chair), Hyungsoon Choi; *Local Organizing Committee*: Hiroshi Fukuyama (chair), Tomohiro Matsui, Masashi Morishita, Satoshi Murakawa, Sachiko Nakamura.

The 12 main conference topics were: Topological Quantum Fluids, Qubits and Quantum Information, Superconductors, Quantum Turbulence, Superfluid He-3, Superfluid He-4, Quantum Solids, Spin Liquids and Magnetism, Cold Gases, Neutron Stars, Fluids in Nanopores, Novel Techniques

1.2 Commission Meetings

Commission C5 met at LT28 in August 2017. Subsequent business has been conducted by e-mail and will continue in this mode until the next face-to-face meeting in 2020 which is the next international Low Temperature Conference. The site of LT29 in 2020 has been identified and the conference has

been accepted and endorsed by the C5 commission and IUPAP. Work is in progress to identify the next Low Temperature Conference (LT30, Type A) in 2023, the next ultra-low temperature conference in 2020 (ULT2020-Type B), and the next QFS conference (QFS2021-Type B)

1.3 C5 Sponsored Prizes Awarded

IUPAP C5 Young Investigator Prize awarded every three years:

Dr. Clifford Hicks (Max-Planck Institute for Chemical Physics of Solids, Dresden, Germany),

Vlad Pribiag (University of Minnesota, Minneapolis, USA)

Fritz London Memorial Prize:

William Halperin (Northwestern University, Evanston, Illinois USA), James Sauls (Northwestern University, Evanston, Illinois USA), Jeevak Parpia (Cornell University, Ithaca, NY USA)

Simon Memorial Prize:

Professor Louis Taillefer (University of Sherbrooke and the Canadian Institute for Advanced Research, Sherbrooke Canada)

2.0 Activity Current Period 2019-2020

2.1 Sponsored Conferences held this Period

Type B

International Conference on Quantum Fluids and Solids (QFS 2019)

August 7-13, 2019, University of Alberta, Edmonton, Canada

Chairs: John Beamish, John Davis

The International Symposium on Quantum Fluids and Solids (QFS2019) was held at the Centennial Centre for Interdisciplinary Sciences on the University of Alberta campus, from August 7 through 13, 2019.

This conference is held annually, except in years when the QFS community meets as part of the larger International Conferences on Low Temperature Physics (LT conferences). The QFS conference location traditionally rotates between Europe, Asia and North America. Recent QFS meetings were held at the University of Tokyo in Japan (2018) and in Prague, Czech Republic (2016), and LT28 was held in Sweden in 2017.

QFS2019 attracted 170 registered participants from 20 different countries. The highest participation came from Japan (36) followed by USA (33), Canada (30), UK (18), Finland (7), Korea (7), France (6), Germany (5), India (4), Australia (3), Czech Republic (3), Russia (3), and Slovakia (3), etc. There were also 13 registered accompanying persons from 5 different countries.

The conference program was prepared by local organizing committee consisting of the QFS2019 co-Chairs, John Beamish and John P. Davis, together with Lindsay LeBlanc and Joseph Maciejko and administrative assistance from Kailey Robertson and Skylar Brown. Speakers were selected based on input from the QFS2019 International Advisory Committee, which included 30 members of the QFS community from 13 countries. The final program included 43 invited talks plus an additional 17 oral presentations selected from the submitted abstracts. The 60 speakers came from 17 different countries. The talks were supplemented by three poster sessions with a total of 109 poster presentations. From these, an international committee of poster judges selected nine winners of "best poster" awards.

The scientific program included the traditional QFS core topics, including superfluid ^3He and ^4He , 2D films and confined helium, quantum solids, electrons on helium, quantum turbulence

and vortices, and experimental techniques and devices. The conference also included sessions on related areas of physics, including superfluid optomechanics, cold atoms, topological and quantum Hall systems, and dark matter detection. Also, a half-day workshop on Quantum Turbulence was organized by Wei Guo and Makoto Tsubota and held at the QFS venue on August 10, with 12 oral presentations and nearly 40 participants.

The conference proceedings will be published as a special issue of the Journal of Low Temperature Physics, with John Beamish as the guest editors for the proceedings. The deadline for submission of papers is September 1, 2019. As of August 23, 17 papers have been submitted. Each paper will be refereed by two independent reviewers.

Despite challenging demographics, women were represented in our local organizing committee (1/4, i.e. 25%), and on the QFS2019 International Scientific Advisory Committee (6/30, 20%). Five of the speakers at QFS 2019 were women (8%), although four other women were invited to speak but were unable to accept our invitations. Overall, 12 (7%) of the registered participants were women, a low number, but representative of the current demographics of this research field.

2.2 Anticipated, Accepted and Sponsored Conferences Delayed owing to Covid-19

Type A

29th International Conference on Low Temperature Physics (LT29) August 16-22, 2020, Sapporo, Japan

About 1,200 participants

Co-Chair: Naoto Nagaosa and Yoshiteru Maeno

This proposal was approved by C5 at its meeting at LT28. It was submitted for approval for Type A sponsorship to IUPAP and was accepted by C5 and IUPAP for support. It was realized and confirmed on March 31, 2020 that proceeding with this conference was unwise in light of the spreading pandemic Covid-19. On April 22 IUPAP accepted a request for delay of two years in August of 2022.

Type B

ULT2020, Frontiers of Low Temperature Physics. August 24-27 2020, Sapporo, Japan.

Chair: Keiya Shirahama, Keio University

This conference, will be a satellite of LT29 (Type A) and will cover topics similar to those listed above for ULT2017 expanded to include new subjects of topical interest, especially on quantum information science. The number of anticipated attendees is ~200. It was submitted for approval for Type B sponsorship to IUPAP and by C5 and IUPAP for support. It was realized and confirmed on March 31, 2020 that proceeding with this conference was unwise in light of the spreading pandemic Covid-19. On April 22 IUPAP communicated its acceptance of a request for delay of two years to follow LT29 in August 2022 (letter to Naoto Nagaosa).

Type B

QFS2021 was proposed and accepted by C5 on behalf of the organizers by chair Ambarish Gosh to be sited in Bangalore, India. This was approved by C5 and accepted by IUPAP as communicated to C5 on 7/2/20. There are lingering concerns regarding holding a conference in 2021 regarding the disruption on an international scale by the pandemic Covid-19.

William Halperin, C5 chair
August 2020