

外国人客員所員を経験して

Ying RAN

Boston College, Chestnut Hill, MA 02467, USA

ying.ran@bc.edu

I met Prof. Oshikawa for the first time in 2008 when he visited UC Berkeley where I was a postdoc scholar. Of course I knew his work even before that since Prof. Oshikawa made many deep contributions in quantum condensed matter theories. These include his generalization of the Lieb-Schultz-Mattis theorem to higher dimensions and his work on one-dimensional symmetry protected topological phases. More recently, due to the fast developments in topological states of matter, I had interacted with Prof. Oshikawa in many workshops, as well as during his visit to Boston College in Fall 2017. I learned a lot of physics from numerous discussions with him and we collaborated together with Yuan-Ming Lu at Ohio State University in a work: the quantized Hall conductivity constrained by the magnetic translation symmetry.

While I visited Japan a few times previously for conferences, my stay at ISSP as a visiting professor from Jan 2018 to Apr 2018 during my sabbatical leave gave me the first opportunity to deeply interact with the scientific community in Japan. ISSP has an impressive record of contributions in quantum condensed matter physics and topological states of matter. For instance, apart from theoretical experts, experimental experts at ISSP have revealed new correlation-driven Weyl semimetal materials, for instance, Mn_3Sn (Prof. Nakatsuji's group).

My stay in ISSP had a wonderful and memorable experience in terms of both science and culture. I joined the seminars as well as the informal after-lunch discussions in Prof. Oshikawa's group. During these discussions I interacted with a lot of young talented scholars who work on various interesting projects, such

as solving the sign-problem in quantum Monte Carlo and new field-theoretical ways to view Lieb-Schultz-Mattis constraints. I had inspiring discussions and exchanged ideas with other members at ISSP, including Prof. Nakatsuji and Prof. Kawashima. In addition, I had the chance to meet with many visitors to ISSP, including scholars from other institutions in Japan, as well as international visitors. I also participated in the workshop "Novel Phenomena in Quantum Materials driven by Multipoles and Topology". All these demonstrate the dynamical research environment in ISSP.

As a consequence of these interactions, together with Prof. Oshikawa and Dr. Haruki Watanabe, we initiated some exciting new projects during my stay. One project is about using optics as a probe for dynamics in novel states of matter in strongly correlated materials. Another project is on algebraic ways to diagnose and generalize Lieb-Schultz-Mattis-type constraints.

I find myself very comfortable embedded into the Japanese culture. In fact, I grew up watching many Japanese cartoons which were my favorites. I also happened to visit ISSP during the beautiful spring season: participated in two bike tours organized by Prof. Oshikawa, I witnessed the spectacular plum and cherry blossoms.

I would like to thank ISSP for giving me this wonderful opportunity. I also would like to thank Yasuhiro Tada, Masahiko Yamada, Atsuko Tsuji and Yuko Ishiguchi for their warmhearted help during my stay.