Final Circular

The 2nd International symposium on

Clustering as a Window on the Hierarchical Structure of Quantum Systems

--CLUSHIQ2022 (EMMI Workshop)--

Sendai, Japan, Oct 31- Nov 3, 2022

The 2nd international symposium on Clustering as a Window on the Hierarchical Structure of Quantum Systems (CLUSHIQ2022) is held **in Sendai International Center in Sendai**, Japan, **from Oct 31 to Nov 3, 2022.** This is the second of this series following the successful meeting in Beppu, Japan, in January 2020. The symposium is held in a hybrid form with in-person and online participants (in-person participation is encouraged). The symposium is supported by the JSPS grant-in-aid for scientific research on innovative areas (Clustering as a Window on the Hierarchical Structure of Quantum Systems) and EMMI (The ExtreMe Matter Institute, GSI).

This symposium discusses why our material world has a hierarchical structure: quarks, hadrons, nuclei, atoms, and molecules. We focus on "clusters and strong correlations" in each hierarchy, which may provide keys to understanding the hierarchical structure universally. We also discuss characteristic features of correlations/clustering in each hierarchy. Participants are from a wide range of fields: hadron-, nuclear-, atomic- and molecular physics.

The scientific program is devoted to the latest experimental and theoretical research and developments on quantum particles and clusters in each hierarchy and its interrelations, including the generality and universality through the hierarchies. The topics thus include the following subjects:

1. Exotic hadrons using high-energy heavy-ion collisions,
2. Lattice QCD/ab-initio calculations
3. Exotic nuclei, alpha clusters, multi-neutron clusters, NN correlation
4. Three nucleon force, many-body force
5. Hyper nuclei, strangeness, hyperon-nucleon interactions
6. Ultracold atoms and exotic atomic/molecular states/phases, quantum simulation
7. Efimov physics, few-body physics.

The symposium comprises presentations by invited speakers and contributed poster presentations with a 3-min oral presentation each.

Invited Speakers:

Jurgen Schukraft (CERN, Switzerland)
Laura Fabbietti (Technische Universität München, Germany)
Craig Roberts (Nanjing University, China)
Hartmut Schmieden (Universität Bonn, Germany)
Nir Barnea (The Hebrew University of Jerusalam, Israel)
Maytal Duer (Technische Universität Darmstadt, Germany)
Evgeny Epelbaum (Ruhr-Universität Bochum, Germany)
Doerte Blume (University of Oklahoma, US)
Niels Kjærgaard (University of Otago, New Zealand)
Ana P. Majtey (National University of Cordoba, Argentina)
Sonia Bacca (University of Mainz, Germany)
Marek Karliner (Tel Aviv University, Israel)
Joachim Maruhn (Goethe Universität Frankfurt, Germany)
Dmitry S. Petrov (Université Paris-Saclay, CNRS, LPTMS, France)

Venue:

The symposium is held at **Sendai International Center in Sendai**, Japan.
http://www.aobayama.jp/english/

The city of Sendai plays the role of the capital in the north-eastern region of Honshu Island of Japan (Tohoku Region), with about one million inhabitants. It has also been the cultural center of this region since 1600 when Date Masamune, the Great Lord of this region at that time, built Sendai Castle (Aoba castle) and the city. Although the city was once destroyed in WW II, one can find some remains from the era of Date, such as the Aoba Castle site, Osaki-Hachimangu Shrine, Rinnoji Temple, and Zuihoden. It is a very scenic city full of green along the main streets, Hirose River, and the mountains on the city's west side. One can find Sendai is a very vibrant and convenient city, with nice shopping areas with numerous small shops along the arcade streets, shopping centers, hotels, and nice restaurants. One can move around the city using the two major subway lines crossing at the Sendai Station. The main campus of Tohoku University is also on the subway line. The city boasts of a gourmet city as Sendai is famous for beef tang dishes and seafood, the latter owing to the location of Sendai close to a number of fishing hubs (Ishinomaki, Kesennuma, etc.) for fishing ships from the Pacific Ocean. From the city,

only a one-hour train- or bus ride, one can go to one of the most scenic places in Japan, “Matsushima”, along the Pacific Coast (Matsushima is one of the Three Scenic Views in Japan: Others are Miyajima near Hiroshima city and Amano-Hashidate in the north of Kyoto). One can also go to one of the nice onsens (Japanese hot-spring baths) from Sendai within one-hour. One can find more information about Sendai city in
https://www.japan-guide.com/e/e5150.html
https://discoversendai.travel/
http://www.city.sendai.jp/koryu/foreignlanguage/en/sendai/history.html

Directions:

The city of Sendai is conveniently located, about a 1.5-hour bullet train ride from Tokyo. The participants from abroad are recommended to fly into Tokyo Haneda or Tokyo Narita airport, move to Tokyo Station, and take a bullet train (Shinkansen) to Sendai.

From Haneda Airport to Sendai (See Fig.1) : Haneda Airport (Monorail, ~20 min)→Hamamatsucho-(JR Yamanote or Keihin-Tohoku Line (~5min) →Tokyo-(JR Tohoku Shinkansen: Bullet train 1.5-2 hours)→Sendai
(For JR ticket including Shinkansen, you can buy it at Hamamatsucho station: https://www.jreast.co.jp/e/customer_support/service_center_hamamatsucho.html)

From Narita Airport to Sendai (See Fig.2) : **Route1**: Narita Airport-(JR Narita Express ~ 1 hour)→Tokyo-(JR Tohoku Shinkansen: Bullet train 1.5-2 hours)→Sendai
Route2: Narita Airport-(Keisei Skyliner ~40min)→Keisei Ueno-(**a-few-minute walk**)→JR Ueno-(JR Tohoku Shinkansen)→Sendai
*Shinkansen(Tokyo/Ueno←→Sendai): Hayabusa/Komachi: 1.5hours, Yamabiko: 2 hours (Route1: You can purchase the JR tickets including Shinkansen at the JR station at Narita Airport. Route2: you have to purchase separately Keisei and JR tickets. First you have to buy a Keisei Skyliner ticket at the Keisei Narita Airport Station, and then you have to purchase a Shinkansen ticket at JR Ueno Sta. The transfer from the Keisei Ueno Sta to JR Ueno Sta is a bit tricky. If you get out of the Keisei Ueno Station, you better ask someone the direction to the JR Ueno Station if you cannot find it.)

From Sendai Station to Sendai International Center, as shown in Fig. 3, it takes about 5 min by Subway Tozai-Line (T07: Sendai→T04: International Center). It is convenient to purchase a SUICA or PASMO or ICSCA card (IC card) (500JPY deposit is necessary) which can be used as tickets of subways/buses of the most of the cities in Japan. In Sendai

they sell ICSCA which is compatible with SUICA/PASMO). You can use this for some purchases in any convenient stores and some shops, too.
https://www.kotsu.city.sendai.jp/images/sbway/route_map.pdf

Fig.1 From Haneda Airport to Sendai Station: Haneda Airport Terminal 3—(Monorail)-Hamamatsucho-(Keihin-Tohoku/Yamanote)-Tokyo-(Tohoku Shinkansen)-Sendai. For JR ticket, you have to purchase at Hamamatsucho station.

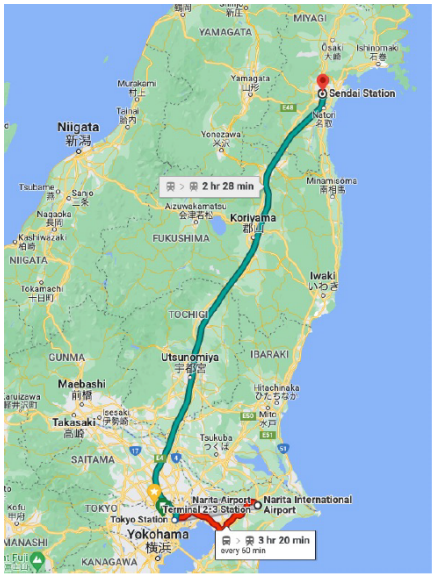

Fig.2 From Narita Airport to Sendai Station: Route1: Narita Airport—(JR Narita Express)-Tokyo-(Tohoku Shinkansen)-Sendai ; Route2: Narita Airport—(Keisei Skyliner)-Keisei Ueno-JR Ueno-(Tohoku Shinkansen)-Sendai.

Fig.3　Sendai Station→ International Center Station. If you can purchase ICSCA at a subway station (compatible with SUICA/PASMO in Tokyo, IC card for transportation), you can use it as a subway ticket and is convenient.

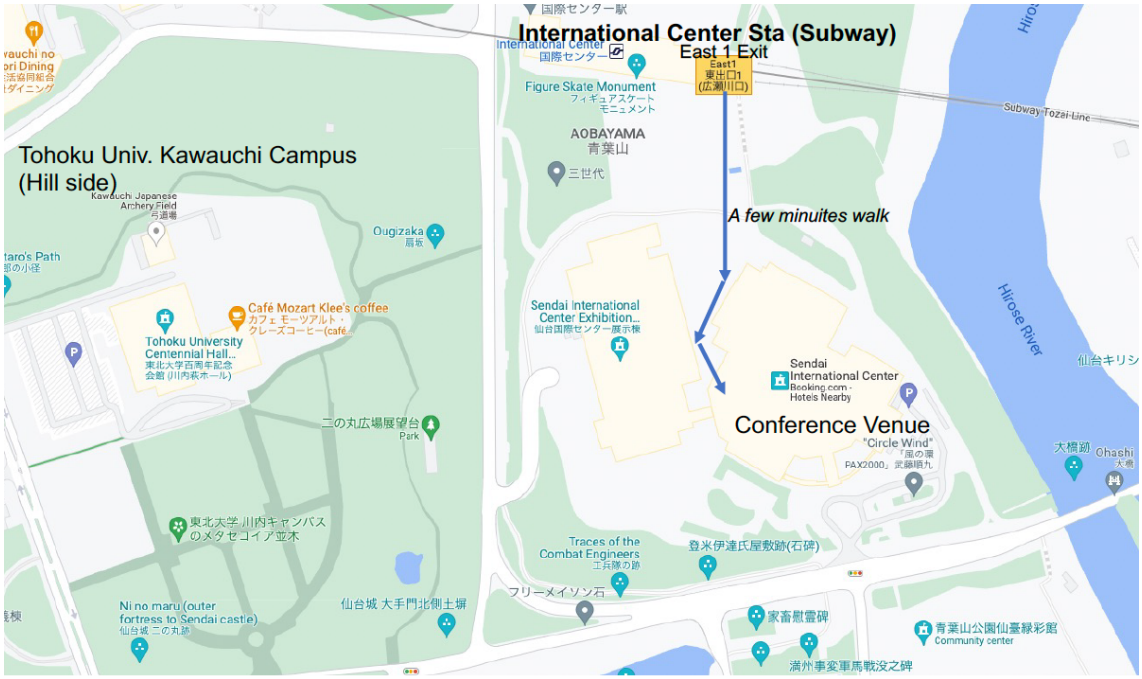

Fig 4. From International Center Station to the Conference Venue (Sendai International Center) by walk

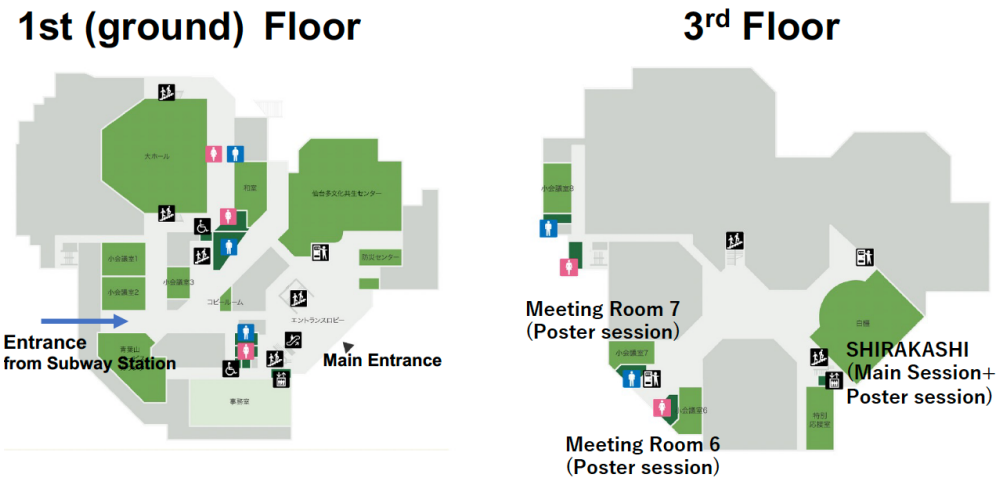

Fig.5. International Center: From the subway station, you will enter the minor entrance on the west side. The Conference Venue is on the 3rd floor.

Lunch:

You can go to lunch either at a canteen/restaurant/cafe in the Tohoku University Campus (Fig.6) or a restaurant/cafe near the Omachi Nishikoen Station area (10-15min walk, Fig6&7). If you have a big party, we recommend you to go to one of the canteens of Tohoku University. If you prefer a quick lunch, we recommend you to buy a lunch box before you come to the venue in the morning.

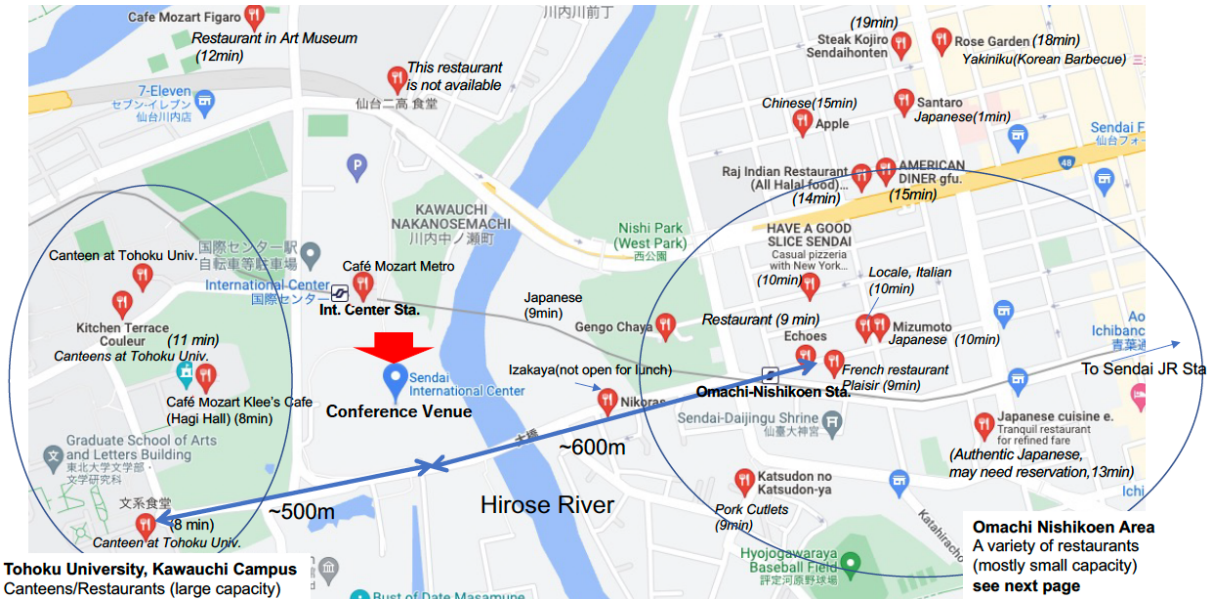

Fig.6 Lunch Map-1: Tohoku Univ. Campus and Omachi Nishikoen Area(See also Fig.7)

Fig 7. Lunch Map 2: Omachi Nishikoen Area (10-15min walk)

Café/Shop inside the Sendai International Center： Aobayama Service Center at Sendai International Center: 11:00-16:00: They sell also sandwiches and light meals such as rice balls, but there are only few types and the number is limited.

Information for Presenters:

The conference program can be found at
http://be.nucl.ap.titech.ac.jp/cluster/symposium/334/

Oral Presentation The oral presentation will be presented using the PC which is prepared by the organizer. Please put your presentation source to a USB and copy it on the PC well in advance of the session assigned. The USB will be prepared by the organizer.

Poster Presentation will be held **17:30-18:00, 31st Oct, and 14:30-16:00, 1st Nov.** Each poster presenter is asked to give a short oral presentation on his/her poster content within 3 minutes.

Poster Session will be held **16:20-18:00, 1st Nov at Meeting Room 6, 7 and Shirakashi (see Fig.5),** ID number will be attached in the board. Please prepare your poster from afternoon break on Oct 31. Poster awards (ANphA awards) will be given to three best poster presentations. The awards are sponsored by ANPhA (Asian Nuclear Physics Association). All the posters presented by **students** (ID numbers on red sheets) are reviewed for the awards. (Other posters with white sheets are not reviewed). After the poster session, please remove your poster as soon as possible. Meeting Room 6,7 will be completely closed and poster boards will be taken away **at 19:00, Nov. 1st.**

For those participating online;

The Zoom ID is announced for the registered participants.

Local Organizers:

The conference is organized by the board members of the project "Clustering as a Window on the Hierarchical Structure of Quantum Systems" (JSPS grant-in-aid for scientific research on innovative areas):

Takashi Nakamura (Chair, Tokyo Institute of Technology)
Kenta Shigaki (Hiroshima University)
Hiroaki Ohnishi (ELPH, Tohoku University)
Hirokazu Tamura (Tohoku University)
Yoshiro Takahashi (Kyoto University)
Munekazu Horikoshi (Osaka Metropolitan University)
Emiko Hiyama (Tohoku University)
Kimiko Sekiguchi (Tokyo Institute of Technology)
Yosuke Kondo (Tokyo Institute of Technology)
Toshiyuki Takahashi (KEK)
Atsushi Hosaka (RCNP, Osaka)

Further information will be given at

http://be.nucl.ap.titech.ac.jp/cluster/symposium/334/

Contact: clushiq2022-contact@mail.nucl.ap.titech.ac.jp