Recent progress in many-body theories (RPMBT22): Conference report

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Introduction: The 22nd International Conference on Recent Progress in Many-Body Theories (RPMBT22) was held September 23 to 27, 2024, in Tsukuba, Japan. It was hosted by Tsukuba University with the support from Nishina Center, RCNP, ERATO Project and Inoue Foundation for Science. The RPMBT conference series serves as an ideal opportunity to acknowledge important achievements and present significant new results across various facets of many-body physics.

Scientific Program: The scientific program for RPMBT22 was structured around diverse key areas within many-body physics. The topics included:

- Computational quantum many-body physics
- Condensed matter physics
- Non-equilibrium many-body phenomena
- Nuclear and subnuclear physics
- Quantum chemistry, atomic and molecular physics
- Quantum fluids and ultracold gases
- Quantum information and computation
- Other topics in new frontiers

The program included sessions dedicated to each of these areas, featuring presentations by researchers. Forty-six oral presentations and twenty-four poster presentations were given. Nuclear physics was one of the key areas, and its various aspects were discussed through the presentations:

- Ab-initio calculations of heavy nuclei.
- Properties of exotic nuclei, including those along the r-process path, and phenomena near drip lines.
- Nuclear matter and correlations of nucleons
- Self-consistent potential describing nuclear structure to intermediate-energy scattering.
- Variational theories for nuclear systems
- Quantum computing for nuclear physics
- Nuclear structure phenomena such as shape fluctuation and rotational modes caused by pair condensation

Award Session: A session was devoted to the Feenberg Memorial Medal and the Hermann Kümmel Early Achievement Award. The Feenberg Medal is awarded for well-established work that has notably advanced the field of many-body physics. The Kümmel Award aims to support and recognize young individuals who have demonstrated excellence in quantum many-body theory. Laudatios were given for the Feenberg Medal by Gerardo Ortiz and Kümmel Award by Jordi Boronat.

Conclusion: The RPMBT22 conference successfully facilitated the exchange of recent progress in many-body theories. With a comprehensive scientific program spanning numerous subfields, the event provided a valuable platform for researchers to present their latest results through oral and poster sessions. The conference highlighted significant contributions to the field through the Feenberg Memorial Medal and Hermann Kümmel Early Achievement Award presentations and fostered scientific discourse through dedicated discussion periods.

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