

Mathematical Physics Laboratory

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Mathematical Physics Laboratory, led by Associate Chief Scientist Koji Hashimoto, has been in Nishina Center for the period of April 2010–March 2015.

Here, we briefly summarize the research achievements of the laboratory.

- 74 published papers in international refereed journals, as well as 26 preprints and 9 proceedings
- 9 workshops including several workshops with more than 100 participants
- 97 lab seminars

The laboratory consists of Koji Hashimoto, the head of the lab, and 17 post-doctoral researchers in total. Among those, 4 post-doctoral researchers were promoted to permanent faculty positions in universities and research institutes.

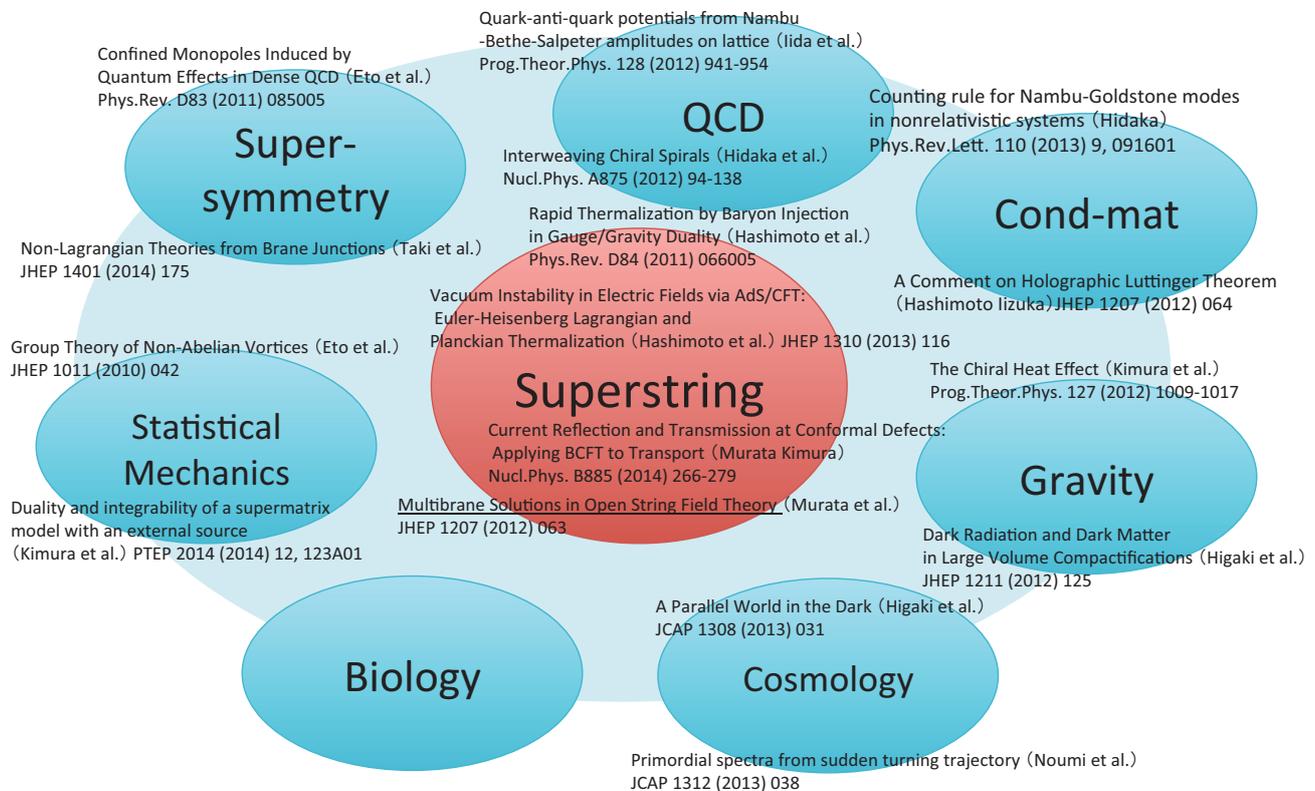
The Mathematical Physics Laboratory was formulated such that every member can go through various subjects in theoretical physics by using the powerful force of mathematics. In particular, mathematical con-

cepts of superstring theory have been applied to nuclear physics, elementary particle physics, condensed matter physics, and cosmology. Obviously, these fields are very different subjects from the viewpoints of energy scales, tools, objectives, and goals. However, a common mathematical structure can bridge different subjects. Our achievement is mostly on the relation between hadron physics and gravity. One of the interesting outcomes was a generalization of the Nambu-Goldstone theorem found by Dr. Hidaka, one of our members.¹⁾

The idea of bridging different subjects in science, which is attempted in this laboratory, was in line with the original idea of the foundation of RIKEN. The idea was confirmed to be successful and resulted in a number of interesting research papers. It became one of the origins of the iTHES project in RIKEN, and the laboratory promoted young researchers to find novel opportunities in sciences.

Reference

- 1) Y. Hidaka, Phys. Rev. Lett. **110**, 9, 091601 (2013).



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