

4th International Workshop on Spin Currents & 2nd International Workshop on Spincaloritronics

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Period of workshop 2010.2.8-2010.2.10

1. Background and purpose of proposed research period

Spin Current is a key for Spin-Electronics (Spintronics), which is the science and technology of harnessing the electron spin degree of freedom in circuits and devices in order to realize new or improved technological functionalities. Recently, it was also noted that spin current can be generated by the control of temperature gradient and the corresponding thermoelectric phenomena in small structures. Spin Caloritronics is defined by the intersection of both fields.

The purpose of this Workshop is to provide a forum to the international community for discussion of spin-electronics and spin caloritronics.

The first and second International Workshops on Spin Current were held in IMR, Tohoku University in February 2007 and February 2008, respectively. Both of them attracted much attention in the spin-electronics community in the world. The third one was co-organized by Stanford University (Prof. S. C. Zhang) and IBM (Dr. S. Parkin) in California in April 2009. Since this international workshop was initiated by IMR, it has been expected by the international community that the fourth one would be in Sendai, “the center of spin-electronics.”

In February 2009, the International Workshop on Spin Caloritronics was co-organized by IMR and Lorentz Center at Leiden, the Netherlands. The second one has been expected to be held in IMR.

Prof. Takanashi organizes the National Research Project on Spin Current. The workshop will also be in the activity of the Takanashi Project.

2. Proposed plan

- I Schedule and planned month/year: February 8-10, 2010
- II Number of participant expected: 100
- III Relation with other conferences: Takanashi Kakenhi Project, Foundation Advanced Technology Institute
- IV Plan for publication of workshop achievement: Home Page, Abstract Booklet

3. Results and discussions:

- I Workshop period: February 8-10, 2010
- II Number of participants: 124
- III Number of oral presentations: 36
- IV Number of poster presentations: 32
- V Best poster awards: Mr. M. Wada, Dr. B.-C. Min, and Mr. F. Bakker

4. Summary and perspective

The workshop has achieved a high measure of success with 124 participants gathering from Asian, European, and North American countries. Presented topics ranged over many subject: spin Hall effect, quantum spin Hall effect, spin-orbit interaction, spin-motive force, interface and interlayer coupling, spin-transfer torque, magnetization dynamics, and spin injection.

Several new and partly unpublished discoveries in the field of spin caloritronics have been discussed, such as the spin (wave) Seebeck effect in magnetic insulators, the spin-dependent Seebeck effect in magnetic nanostructures, the magnonic thermal Hall effect, and first indications of the thermal spin transfer torque, and magnetic heat engines.

In summary, we are confident that the topic will remain sufficiently fresh and interesting to warrant another international workshop on Spin Currents and Spin Caloritronics.

Reference

- [1] Workshop Home page: <http://www-lab.imr.tohoku.ac.jp/~spincurrent/>



