



# 清华大学高等研究院

Institute for Advanced Study, Tsinghua University

## 学术报告

**Title:** Energy Harvesting by Spin Current

**Speaker:** Sadamichi Maekawa

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**Time:** 3:30pm, Monday, September 23, 2019

**Venue:** Conference Hall 322, Science Building, Tsinghua University

### Abstract

The flow of electron spins, the so-called “spin current”, is a key concept in the recent progress in spintronics [1,2]. In a ferromagnet, the spin current interacts with magnetization by the exchange interaction and induces the motion of the magnetization due to the angular momentum conservation, the so-called spin transfer torque. Its inverse effect is called the spin-motive force which is the electric voltage generated by the magnetization dynamics due to the energy conservation between electrical current and magnetization [3]. The spin motive-force is derived by introducing spin Berry phase in the Faraday’s law of electro-magnetism.

Spin current is induced and manipulated by heat [4] and mechanical motion [5,6] as well. The interconversion between various energies through spin current , the so-called “power spintronics”, is discussed.

- [1] “Concepts in Spin-Electronics” ed. S.Maekawa (Oxford Univeristy Press, 2006),
- [2] “Spin Current” eds. S.Maekawa, et al. (Oxford University Press, 2012 and 2017),
- [3] S.E.Barnes and S.Maekawa,: Phys. Rev. Lett. 98, 246601 (2007),
- [4] K.Uchida et al: IEEE Proc. 104, 1946 (2016),
- [5] R.Takahashi et al.: Nature Phys. 12, 52 (2016),
- [6] R.Takahashi, et al.: to be published (2018).