凝縮系物理学インフォーマルセミナー
Informal Condensed Matter Seminar

Location: Room 413, School of Science Bldg. 5 (理学 5 号館 413 号室)

Date: 13:00-14:30, Thursday, 8 November 2012

"Transport phenomena and gauge theory of gravity"

Speaker: Dr. Taro Kimura (RIKEN)

Abstract:

One of the most important properties for the transport phenomena is the conservation law: charge conservation for the electric transport and energy conservation for the heat transport, etc. In the context of quantum field theory, the conserved current can be constructed as Noether current, which is associated with the corresponding continuous symmetry. Indeed the charge conservation is guaranteed by U(1) gauge symmetry. In this talk, we would like to show the viscoelastic transport phenomena is described from the view point of the gauge theory as well as the heat transport [1], and the corresponding gauge symmetry is coming from the general covariance in general relativity [2]. We will also discuss some applications of these formulations to topological field theory, which are well investigated in the context of topological insulators/superconductors.

This talk is based on the collaboration with Y. Hidaka (RIKEN), Y. Hirono (U Tokyo/RIKEN), and Y. Minami (RIKEN).

References:

1. J. M. Luttinger, Phys. Rev. 135 (1964) A1305--A1514.
2. Y. Hidaka, Y. Hirono, T. Kimura, Y. Minami, arXiv:1206.0734 [cond-mat.mes-hall]; work in progress.