

# 凝縮系物理学ゼミナール

## Condensed Matter Seminar

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

Date: 13:30–15:00, Wednesday, 18 December 2013

### “A theoretical study of interface phenomena in Kondo lattices”

Speaker: **Mr. Suguru Ueda** (Condensed Matter Theory Group)

Abstract:

Since the fabrication of an oxide heterostructure  $\text{LaTiO}_3/\text{SrTiO}_3$ , interface phenomena of strongly-correlated-electron systems are rapidly developing into one of exciting directions in condensed matter physics [1]. Most of experimental and theoretical efforts are driven by their rich, complex, and potentially useful behavior originating from the interplay between the spatial inhomogeneity and the electron-correlation effects.

Recent experimental progress enables us to access the interface nature of f-electron systems such as  $\text{CeIn}_3/\text{LaIn}_3$  and  $\text{CeCoIn}_5/\text{YbCoIn}_5$  [2], and their intriguing electronic properties have been theoretically discussed [3]. In this talk, to obtain further insight into the physics of the interface of f-electron compounds, we theoretically investigate the heterostructure composed of Kondo lattices within the framework of the inhomogeneous dynamical-mean-field theory. It is found that the charge redistribution realizes the conducting interface in the heterostructure of Kondo lattices, which also shows the ferromagnetism. We will also discuss how the thickness of the f-electron layers modifies the interface metallicity and the possible phase diagram.

References:

[1] A. Ohtomo, D. A. Muller, J. L. Grazul, H. Y. Hwang, *Nature* **419**, 378 (2002).

[2] H. Shishido, T. Shibauchi, K. Yasu, T. Kato, H. Kontani, T. Terashima, and Y. Matsuda, *Science* **327**, 980 (2010).

[3] R. Peters, Y. Tada, and N. Kawakami, *Phys. Rev. B.* **88**, 155134 (2013).