

668th ASRC Seminar

Date: Wednesday, February 22, 15:00 ~ 16:00

Location: Room 103, ASRC bldg.

Speaker: Professor Takashi Hotta
(Tokyo Metropolitan University)

Title: A convenient model of f-electron system on the basis of a j-j coupling scheme and its application to two-channel Kondo phenomena

Abstract: It has been a longstanding issue to understand magnetism and superconductivity in f^2 electron systems such as uranium and praseodymium compounds from a microscopic viewpoint. For the purpose, it is necessary to prepare a realistic and convenient f-electron model. I believe that a basic strategy to construct such a model is to exploit a j-j coupling scheme [1], but it is rather difficult to develop a convenient model which is also applicable to the Γ_3 non-Kramers system [2].

In this seminar, I introduce a convenient prescription to construct effective interactions among $j=5/2$ electrons, which correctly reproduce all the crystalline electric field states for f^2 systems, including the Γ_3 non-Kramers state. As an example of the application of this model, I will report some interesting numerical results for two-channel Kondo phenomena found in the non-Kramers f^2 state coupled with Γ_8 conduction bands. I will also discuss a possibility of the non-Fermi liquid state.

[1] T. Hotta and K. Ueda, Phys. Rev. B 67, 104518 (2003).

[2] T. Hotta and H. Harima, J. Phys. Soc. Jpn. 75, 124711 (2006).

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