790th ASRC Seminar

Date: Sept. 17 (Thursday), 15:00~16:00

Location: **Zoomによるオンライン会議**
(Meeting room 103, ASRC bldg.)

Speaker: Dr. Andreas Wörl
(Center for Electronic Correlations and Magnetism,
University of Augsburg, Germany)

Title: Thermal Expansion and Magnetostriction of the single impurity two-channel Kondo candidate $Y_{1-x}Pr_xIr_2Zn_{20}$
（2チャンネル不純物近藤効果が期待される$Y_{1-x}Pr_xIr_2Zn_{20}$の熱膨張と磁歪）

Abstract:

In recent years, Pr-based 1-2-20 materials have attracted great attention due to the interplay of quadrupole order and superconductivity as well as the possible formation of two-channel Kondo effect, based on their quadrupolar non-Kramers ground state doublets [1,2]. In $PrIr_2Zn_{20}$ for instance, antiferroquadrupolar order sets in at 0.11 K [3], accompanied by signatures of two-channel Kondo effect [4].

In this talk I will focus on the thermal expansion and magnetostriction of the diluted system $Y_{1-x}Pr_xIr_2Zn_{20}$, for which recent studies [5,6] revealed logarithmic temperature dependencies of specific heat over temperature [5] and quadrupole susceptibility [6] as well as an unconventional square root temperature dependence of electrical resistivity [5], indicative of a single impurity two-channel Kondo ground state. Because of the direct coupling of quadrupole moment and strain, thermal expansion and magnetostriction are powerful probes to further characterize this unconventional ground state. Our study reveals highly singular and anisotropic strain dependencies accompanied by small volume changes, which we discuss in the framework of the single impurity quadrupolar two-channel Kondo effect.

[1] T. Onimaru and H. Kusunose, J. Phys. Soc. Jpn. 85, 082002 (2016).
[2] A. Sakai and S. Nakatsuji, J. Phys. Soc. Jpn. 80, 063701 (2011).
[3] T. Onimaru et al., Phys. Rev. Lett. 106, 177001 (2011).
[4] T. Onimaru et al., Phys. Rev. B 94, 075134 (2016).
[5] Y. Yamane et al., Phys. Rev. Lett. 121, 077206 (2018).
[6] Y. Yanagisawa et al., Phys. Rev. Lett. 123, 067201 (2019).

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