

SFB 608

Einladung zum Kolloquium

- Ort:** Universität zu Köln
II. Physikalisches Institut
Seminarraum 201
- Zeit:** 05. August 2009, 14:30 Uhr s.t.
- Sprecher: Prof. Dr. Hisao Kobayashi**
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- Thema:** Electronic states of mixed valence rare earth compounds under high pressure

At ambient pressure, mixed valence Eu_4As_3 and Sm_4Bi_3 compounds with an anti- Th_3P_4 structure show the charge orderings at 345 and 260 K, respectively, accompanied by trigonal distortion, which are similar to that in Yb_4As_3 . In Eu_4As_3 , ferromagnetic order occurs at 18 K. On the other hand, anomalies in specific heat and magnetic susceptibility were observed at 2.7 K in Sm_4Bi_3 . The hybridization of a narrow 4f band with broad conduction bands is one of the important parameters in these charge-ordering compounds, which is possible to be controlled by hydrostatic pressure.

Recently, we have carried out x-ray diffraction and ^{151}Eu and ^{149}Sm nuclear forward scattering (NFS) measurements under high pressure at BL10XU and BL09XU on SPring-8. It was found in Eu_4As_3 that a trigonal structure does not change up to 19 GPa. Meanwhile, the pressure dependence of a distortion angle changes at 9.5 GPa although volume shows no anomaly as a function of pressure. We present clear evidence by the pressure dependences of local volumes at two nonequivalent Eu sites that this anomaly corresponds to a melting of static charge-order. Quantum beats due to magnetic hyperfine field are observed in ^{151}Eu NFS spectra at 2 K under high pressure. The temperature dependences of ^{151}Eu NFS spectra reveal that a pressure dependence of T_c shows anomaly around 9.5 GPa. I will present the recent results of ^{149}Sm NFS on Sm_4Bi_3 at low temperature and under high pressure.

gez. Abd-Elmeguid