

# COEセミナー

日時：10月6日（金）16：30～17：30

場所：理学部H棟3F コミュニケーションスペース

## Field-induced re-entrant superconductivity in ferromagnetic URhGe

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Recently superconductivity has been observed to appear and co-exist with ferromagnetism in several materials. URhGe is unique amongst them in that bulk superconductivity occurs at zero pressure; superconductivity ( $T_c=0.3$  K) co-exists with ferromagnetism ( $T_{Curie}=9.5$  K) at low magnetic field. A spontaneous rotation of the ordered magnetic moment was observed at a magnetic field,  $H_M=12$  Tesla, applied parallel to the  $b$ -axis of the orthorhombic crystal structure (perpendicular to the low-field easy-axis direction, the  $c$ -axis). Surprisingly, superconductivity re-appears around this spin-rotation transition. When the magnetic field is inclined from  $b$  to  $c$ -axis, the transition moves to higher fields and becomes second order at a few degrees, thus giving rise to a quantum critical point. However, when the magnetic field is rotated from  $b$  to the hard  $a$ -axis the transition remains weakly first order and always occurs as far as the field component along the  $b$ -axis reaches  $H_M = 12$  Tesla. The re-entrant superconductivity closely follows the angular dependence of the spin-rotation transition and was traced up to 28 Tesla. The intrinsic relationship between the two phenomena will be discussed.

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