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EINLADUNG zum IFP-SEMINAR

Thema: **Physical properties and NMR Study of the $Al_{13}TM_4$ family of complex intermetallic phases**

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Host: Silke Bühler-Paschen

Termin: **Mittwoch, 24. November 2010, 16:00 Uhr**

Ort: TU Wien, Institut für Festkörperphysik
Freihaus Seminarraum 138B, Turm C, 7. OG (rote Leitfarbe)
Wiedner Hauptstraße 8-10, 1040 Wien

We present anisotropic physical properties and NMR study of the $Al_{13}TM_4$ (*TM* = Co, Fe, Ni, Ru) family of complex intermetallic phases. Single crystals grown by the Czochralski technique have orthorhombic or monoclinic unit cell with four atomic layers within one periodic unit. The crystallographic-direction-dependent measurements were performed along three orthogonal directions. One set of measurements was performed along the stacking direction perpendicular to the atomic planes, whereas other measurements were performed within the atomic planes. The electronic transport and magnetic properties exhibit significant anisotropy. The stacking direction was found to be the most conducting direction for the electricity and heat. The effect of substitutional disorder on the physical properties of these phases was studied on the $Al_{13}Fe_4$ and its ternary derivative $Al_{13}(Fe,Ni)_4$. Anisotropic Hall and Seebeck coefficients reflect complex structure of the anisotropic Fermi surface. ^{27}Al NMR spectroscopic study has shown that all these phases contain structural detail of a nearly linear *TM*–Al–*TM* atomic group trapped inside an elongated cage composed of aluminum atoms, resembling the tree-dimensional "cage-compound" structure of the intermetallic clathrates.

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