MM 10 Symposium Complex Metallic Alloys, Hauptvortrag Janez Dolinsek

Zeit: Freitag 17:00–17:30 Raum: TU H1058

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Magnetic and Transport Properties of Al-based Complex Metallic Alloys — •Janez Dolinsek — J. Stefan Institute, Jamova 39, SI-1000 Ljubljana, Slovenia

Complex Metallic Alloys (CMA) are intermetallic compounds with crystal structures based on giant unit cells with an edge length of several nanometers and containing many tens up to more than a thousand atoms per unit cell. The examples are β-Al3Mg2 (1168 atoms/u.c.), orthorhombic ξ'-Al74Pd22Mn4 (320 atoms/u.c.) with its Ψ-modification (about 1500 atoms/u.c), etc. Recently, high-quality samples of orthorhombic Al-Cr-Fe, ξ'-Al-Pd-Mn and Ψ-Al-Pd-Mn giant-unit-cell materials were prepared and their physical properties were studied. The electrical resistivities show very weak (or no) temperature dependence between room temperature and 4 K. The magnetic susceptibility shows the existence of a tiny fraction (of about 1 percent for the Al-Cr-Fe samples and about 100 ppm for the ξ'-Al-Pd-Mn and Ψ-Al-Pd-Mn) of localized magnetic moments with Curie-like temperature dependence. Thermal conductivity measurements show that the electronic and lattice contributions are of comparable size. The thermoelectric power can be either positive or negative with a complicated temperature dependence.