

Assessment on Mgr. Petr Čermák

The work of Petr Čermák is focused on the magnetic properties of R_2RhIn_8 with $R = Nd, Tb, Dy, Ho, Er$ and Tm , i.e. the magnetic analogues of heavy fermion unconventional superconductor Ce_2RhIn_8 . It is a part of broader investigation of structurally related tetragonal compounds which consist of different stackings of RIn_3 and TIn_2 layers and include mainly the so called 115 and 218 compounds.

In the first part of his study, Petr prepared the selected compounds in the form of single crystals by solution growth method, characterized the crystals by X-ray and EDX techniques and performed the specific heat and magnetization measurements on these crystals. As a main result, the magnetic phase diagrams were constructed. For compounds with the c-axis as the easy magnetization axis, the phase diagrams show some common features, which also resemble those of 115 compounds.

For the second part of his PhD study, Petr moved for one year to ILL Grenoble where he performed a series of diffraction experiments revealing magnetic structures in studied compounds. First, he used the Laue technique to determine the propagation vectors. The standard single-crystal diffraction experiments then followed to determine fully the magnetic structures. These results are accompanied by extensive representation analysis and discussion. In the case of R_2RhIn_8 , Petr has performed also the diffraction experiment in external magnetic field. The magnetic structure in the field-induced magnetic phase was determined for the first time in this group of materials. The similarity of bulk properties then leads to a tentative conclusion, that this magnetic structure is common to all 115 and 218 compounds with moments along the c-axis.

During his stay in Grenoble, Petr also intensively participated in development of the new ThALES spectrometer and software development for data analysis. His activities in neutron research led to his subsequent position in FRM II, Munich neutron scattering center as instrument co-responsible by PANDA spectrometer.

The results of his work Petr Čermák presented in 6 original papers in peer-reviewed journals and on several international conferences. I believe that he will successfully defend his PhD thesis and will continue in research activities probably related to neutron scattering techniques.