

**Report to the Office of International Programs -
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**International Cooperation with Charles University, Czech
Republic - A 4-week visit in June 2000**

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Summary

I visited the Department of Electronic Structures (DES) at Charles University (CU) in Prague for 4 weeks in June of 2000. The DES is a new department of the Institute of Physics at CU. The main goal of this visit was to further our collaboration in the study of novel magnetic materials. During this visit we focused our attention on the electronic and magnetic properties of CePtSn, and on the crystal growth of CeCu₆. In the case of CePtSn, our measurements of specific heat at low temperatures and high magnetic fields show anomalies that are correlated in temperature and field with the anomalies that we observed previously in the electrical resistance. These results suggest that the low-field spin-slip phase can be suppressed by the application of an external magnetic field. We envision the further exchange of samples, data, and ideas, as well as future visits.

The visit to Charles University

The main goal of this visit to Charles University in Prague was to

further our cooperation with the scientists and students of the Department of Electronic Structures in the Institute of Physics. Similarly to SDSU, there is a strong commitment at Charles University to engage students in research projects. Charles University has signed agreements of academic cooperation with over 100 universities worldwide, including 4 in the United States.

We have an on-going collaboration with Professor Vladimir Sechovsky from CU and his students, since 1994. This collaboration yielded some important results towards the understanding of the magnetism in NdCu_2 , $\text{U}_2\text{Cu}_9\text{Al}$, and U-Co-T-Al (T = transition metal) alloys. The results of these studies were published in refereed journals.

During this 4-week visit to Charles University we focused our attention on the properties of two compounds, CePtSn and CeCu_6 . CePtSn is known for displaying a quite complex magnetic phase diagram. A topic of great interest in the literature since 1995 is whether the magnetic structure is incommensurate with the lattice, or it is commensurate in the short-range with periodic magnetic defects called spin-slips. Our previous measurements of electrical resistivity in high magnetic fields revealed a very anomalous phase transition at 2K in a field of 3.5T. Measurements of specific heat in Prague by graduate student Tanya Khmelevska confirmed the occurrence of this anomaly, linking the thermal and transport behavior to the same electronic origin. The results of this research are subject to 2 conference papers (submitted), and one manuscript (in preparation). I worked also with Professor Pavel Svoboda and his students in the growth of CeCu_6 single crystals using a tri-arc furnace. This is still a work in progress.

The match between SDSU and CU's research interests is excellent. Our laboratories supplement each other in many ways, and the commitment to training students is very strong in both institutions.

We will continue cooperating informally in the future by means of exchanging data, samples, and ideas, and publishing jointly. We plan to visit each other's institution in the near future again. We are particularly interested in furthering our effort towards understanding better the properties of other magnetic materials displaying spin-slip structures, as for example, holmium erbium and PrGa₂.