

# 504th ASRC Seminar

Date: 10:30 - 11:30, 28 February

Location: Meeting room 302, ASRC Building

Speaker: Dr. Robert Eichler  
(Paul Scherrer Institute)

Title: Superheavy Element Chemistry  
in Switzerland

More than 40 new isotopes of Superheavy Elements (SHE,  $Z > 103$ ) have been discovered in the last 10 years at the Flerov Laboratory of Nuclear Reactions, Dubna, Russia in  $^{48}\text{Ca}$  induced nuclear fusion reactions with actinides. Elements with atomic numbers 114 and 116 were recently given their names, Flerovium (Fl) and Livermorium (Lv), respectively. These discovery experiments observed isotopes of transactinides from Rf-113 with half-lives between seconds and several hours. Thus, an even broader experimental playground opened up for their chemical investigations. These experiments shall assess their chemical properties and reveal the influence of relativistic effects in their electron structure. This report will cover only gas phase chemical investigations:

A) Exciting gas phase chemistry results were obtained by the PSI-University of Bern-FLNR-LLNL collaboration with some of the newest heavy transactinides – Cn and Fl.

B) A preliminary status report is included about ongoing gas phase chemistry experiments with element 113.

C) Some possible experiments in other gas phase chemical systems suitable for the investigation of elements Cn, Fl, 113, 115, and Lv will be presented.

D) The recent observation of in-situ transition metal carbonyl compound formation for fission products and recoiling evaporation residues from nuclear fusion reactions behind preseparator pioneers the suggestion of highly interesting experiments with the lighter SHE (Sg-Ds).

Preliminary results of model experiments performed at PSI and University of Bern in close collaboration with IMP\*\* will be presented.

E) Finally, some technical developments are depicted, which are crucial to further improve future transactinide production and their chemical investigation.

<Contact>

Kazuhiko Tsukada (81-5941)

Advanced Science Research Center