



# 594<sup>th</sup> ASRC Seminar



Date: 10:30~12:00, Monday, 1 June

Location: Meeting Room 103, ASRC bldg.

Speaker: Prof. Jens V. Kratz (University of Mainz, Germany)

Title: Multi-nucleon transfer in the reaction  $^{48}\text{Ca} + ^{248}\text{Cm}$ , and syntheses of elements 115 and 117 at TASCA

Abstract: The renewed interest in multi-nucleon transfer reactions as a promising tool for the production of neutron-rich transactinide isotopes has motivated us to perform a  $^{48}\text{Ca}+^{248}\text{Cm}$  bombardment at an incident energy 10% above the Coulomb barrier to study angular distributions and recoil ranges of Cf through Fm isotopes. These were stopped in Ni catcher foils covering slices of laboratory angles between  $17^\circ$  and  $62^\circ$  and differential recoil ranges between  $3\ \mu\text{m}$  and  $6\ \mu\text{m}$ . The foils were dissolved in dilute nitric acid, tracer activities of Lu and Eu were added for chemical yield determination, and the activities were co-precipitated with  $\text{Fe}(\text{OH})_3$  using ammonia to remove Ni, separated from Fe, Pa, U, Np, and Pu on an anion-exchange column in 8 M HCl, separated from Th and Ra on a cation-exchange column in 2.25 M HCl, and separated on a cation-exchange column with 0.12 M  $\alpha$ -HiB and 0.14 M  $\alpha$ -HiB at pH=4.80 into a Fm(Es) fraction and a Cf(Bk) fraction, respectively. These were prepared for  $\alpha$ -particle spectroscopy. The investigated parameters are the centroids of the post-neutron emission isotope distributions and their displacement from the most probable primary fragment mass numbers resulting from Volkov's generalized  $Q_{gg}$  systematics including corrections for the breaking of nucleon pairs in the multi-nucleon transfer process, the angular distributions, and the total kinetic energies TKE. The results for isotopes of transcurium elements up to Fm are presented and discussed.

Recent experiments at TASCA producing elements 115 and 117 in heavy-ion fusion reactions with  $^{48}\text{Ca}$  projectiles are also presented. They reproduce partially results from Dubna, however, significant deviations and alternative interpretations are being presented.



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