520th ASRC Seminar

Date: 14:00 ～15:30, 24 June

Location: Meeting room 302, ASRC Building

Speaker: Dr. Shuhrat Atajanovich Kalandarov
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/short-term JSPS fellow at Tokyo Institute of Technology)

Title: Production of doubly magic nucleus ^{100}Sn in fusion reactions via particle and cluster emission channels

The first mass measurement of doubly magic nucleus ^{100}Sn were done in GANIL(France), which was produced in fusion reaction of ^{50}Cr+^{58}Ni at 255 MeV via alpha,4n evaporation channel. Recently (at 2008) alternative way of production of ^{100}Sn in fusion reactions were suggested by A. Korgul et al.(ORNL) by studying the reaction ^{54}Fe(^{58}Ni,4n)^{108}Xe, which allows to study the ^{108}Xe-^{104}Te-^{100}Sn alpha decay chain.
Inspired from those experimental interests on production of doubly magic nucleus ^{100}Sn and increasing possibility of using the radioactive ion beams as a projectiles, we investigate the production mechanism of ^{100}Sn in fusion reaction via particle(n,p,alpha) and cluster(^{12}C,^{16}O) emission channels in the framework of di-nuclear system (DNS) model.
Our theoretical results show, that the probability of cluster emission channels drastically increase with the decrease of N/Z of compound system.
It means that the element ^{100}Sn can be obtained with very large cross sections in fusion reactions with proton rich radioactive beams via ^{12}C emission channel. The calculated results of excitation functions for the production of ^{100}Sn via particle and cluster emission channels will be presented for the reactions ^{46}Ti(^{58}Ni,4n)^{100}Sn, ^{56,58}Ni(^{50}Cr,alpha,xn)^{100}Sn, ^{76,74,72}Kr(^{40}Ca,^{12}C,xn, or 3alpha,xn) ^{100}Sn and ^{56}Ni(^{58}Ni,^{12}C2n)^{100}Sn.
Also, the excitation functions for the production of ^{108}Xe,^{104}Te(which leads to ^{100}Sn via alpha decay chain) elements will be presented.

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