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# Neutron transfer in reactions 7Li ,48Ca + 197Au at above-barrier energies

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Studies of neutron transfers with the formation of neutron-excess Au isotopes in the reaction are presented for reactions 7Li ,48Ca + 197Au. Using the activation method, the formation cross sections for target-like products were measured. An assembly of several gold targets was irradiated with an ion beam 48Ca at energies 228, 257, 286 MeV. Total flux of particles passing through the collector was measured by elastic scattering on the target Au (2 μm) located after the activation stack [1].
Experimental cross sections for isotopes 191-203Au (in reaction 48Ca+197Au) were obtained, which were produced in the stripping and pick-up neutrons, up-to ±6 neutrons respectively. The time-dependent Schrödinger equation for the outer neutrons was used to calculate the probability of neutron transfer. The isotopic distributions obtained from measurements were compared with calculations from the TDSE approach and the Grazing code. [3][4] (fig.1).

Fig.1. Mass distribution of 197±xAu isotopes nuclear in stripping and pickup neutrons in the reaction 48Ca + 197Au at energies of Elab = 228 (a). Experimental data is represented by circles; calculations using the Grazing code are shown as red curves (with evaporation) and black curves (without evaporation); calculations within the TDSE approach are indicated by asterisks

These results offer valuable insights into the feasibility of generating neutron-rich nuclei through neu- tron transfer reactions and extend the prospects for producing exotic neutron-rich nuclei by selecting appropriate combinations of projectiles and targets.
Similar study was carried out for the 7Li (70 MeV)+Au reaction. Neutron transfer reaction for 1n and 2n channels were observed as well as neutron evaporation channels for fusion reaction, leading to the formation of compound nucleus. Data analyze for this reaction is still in progress now.

1. A. K. Azhibekov et al., Eur. Phys. J. A (2023) 59:278.
2. C. S. Palshetkar et al., Phys. Rev. C 89, 024607 (2014)

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3. Resource is based on the Program Grazing ver.9 (2005) code of Aage Winther

## Section

Experimental and theoretical studies of nuclear reactions

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