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## Probabilities of neutron transfer to free single-particle levels in the reaction <sup>181</sup>Ta(<sup>18</sup>O,<sup>19</sup>O) at near-barrier energies

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Numerical solution of the time-dependent Schrodinger equation (TDSE) 1 is used for studying neutron transfer processes at near-barrier energies. The evolution of the wave functions for outer neutron is determined for reactions <sup>181</sup>Ta(<sup>18</sup>O,<sup>19</sup>O). TDSE allows us to visualize the dynamics of taking place processes [1-3]. The probabilities are calculated for neutrons transfer from outer shells of the target <sup>181</sup>Ta. The results of calculations of transfer cross sections are in satisfactory agreement with experimental data [4] for reaction <sup>181</sup>Ta(<sup>18</sup>O,<sup>19</sup>O). High probability of neutron transfer from the <sup>181</sup>Ta nucleus to the 2*s* orbital of <sup>18</sup>O nucleus at near-barrier energies has been yielded (see Figure 1).

In our previous work [4], differential cross sections for the formation of oxygen isotopes in the reaction  ${}^{18}\text{O}+{}^{181}\text{Ta}$  have been measured at projectile nucleus energy 10*A* MeV on the high-resolution magnetic spectrometer MAVR. Theoretical analysis has been performed in the DWBA formalism using the FRESCO code under the assumption of sequential neutron transfer mechanism.

Fibure 1. Evolution of probability density for for the outer neutrons of  $^{181}$ Ta in collision with the projectilenucleus  $^{18}$ O at energy of 5*A* MeV.

1 A.K.Azhibekov, V.V.Samarin, K.A.Kuterbekov, Time-dependent calculations for neutron transfer and nuclear breakup processes in <sup>11</sup>Li+<sup>9</sup>Be and <sup>11</sup>Li+<sup>12</sup>C reactions at low energy, Chinese Journal of Physics 65 (2020) 292.

2 Yu.E. Penionzhkevich, Yu.G. Sobolev, V.V. Samarin et al., Energy dependence of the total cross section for the <sup>11</sup>Li+<sup>28</sup>Si reaction, Phys. Rev. C 99 (2019) 014609.

3 Yu.E. Penionzhkevich, Yu.G. Sobolev, V.V. Samarin, M.A. Naumenko, Peculiarities in total cross sections of reactions with weakly bound nuclei  $^6{\rm He},\,^9{\rm Li}$  // Physics of Atomic Nuclei 80 (2017) 928.

4 A.K. Azhibekov, V.A. Zernyshkin, V.A. Maslov, Yu.E. Penionzhkevich et al., Differential Production Cross Sections for Isotopes of Light Nuclei in the <sup>18</sup>O+<sup>181</sup>Ta Reaction // Physics of Atomic Nuclei 83 (2020) 94.

Author: Mr AZHIBEKOV, Aidos

**Presenter:** Mr AZHIBEKOV, Aidos

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