One- and two-neutron transfer in the $^{28}Si + ^{18}O$ system

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The direct nuclear reactions can be populate of different kinds of excited states, and each of them is a distinctive opportunity to learn more about particular aspects of nuclear structure. In the last decades, transfer reactions of multi-nucleon have been studied in order to verify what type of mechanism (simultaneous or sequential transfer) best describes the transfer process.

In this work we study single-particle feature for one-neutron transfer and the effects of the paring correlation for two-neutron in the $^{28}Si+^{18}O$ system at bombarding energy of 84 MeV in the laboratory frame. For this, coupled reaction channel (CRC) and coupled channel Born approximation (CCBA) calculations were performed taking into account the cluster , independent coordinates and sequential transfer models. The São Paulo potential was used in the optical potential. For calculus of spectroscopic amplitudes the NuShellX code was used and the sdpn model space with psdmod and psdmwkpn interactions were used for silicon nucleus.

The results of theoretical calculation described with the good agreement the experimental data both one- and two-neutron transfer. And we can observe for two-neutron transfer the sequential mechanism is dominante than simultaneous mechanism.