STRONG RESONANCES AT HIGH EXCITATION ENERGY IN 17O+ALPHA RESONANCE SCATTERING BY TTIK APPROACH

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Recently, first measurements of 17O+alpha resonance scattering were performed in Astana [1]. These measurements revealed a very strong group of the states in the vicinity of a high energy limit of data [1]. These resonances could not be analyzed because they were too close to the edge of the spectrum. Therefore we performed new measurements at higher energy of 17O beam at 54.4 MeV using the TTIK method at the INFN-LNS tandem. An array of four single Si detectors of 500 μm thickness and one dE-E telescope of Si detectors (75 and 1080 μm) were placed at the back of two meter diameter chamber to detect light recoils at different angles including 0º (laboratory system) in steps of 5º. The dE-E telescope was needed to evaluate the contribution of protons to charge particle spectra. At present, the most interesting result of this work is an observation of very strong resonances at high excitation energies of 16 MeV. At this excitation energy the density of states in 21Ne is well over 100 levels per 1MeV. These resonances are also over 10 MeV above the neutron decay threshold. It is not evident, how to obtain additional information about these remarkable resonances. For instance, their observation is practically impossible in a simple 20Ne(n,p) reaction. The data are analyzed in the framework of R-matrix approach. a) b) Fig. 1. a) Excitation function for the 17O(α,α) 17O elastic scattering at 180° degree from INFN-LNS Tandem. b) dE-E spectrum of 17O+4He interaction. More specifically, we are the only group that is developing experimental methods to study resonance reactions in Kazakhstan. Various applications of the resonance nuclear reactions in elemental analysis, in the dating, nuclear medicine and attributing of art objects, in forensics are well known. It is naturally to expect that the developed experimental TTIK methods will be asked by Kazakhstan industry and life.