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The nucleosynthesis of 19F was investigated over the past several years 1. The synthesis of fluorine occurs by 14N(α,γ)18F(β+)18O(p, α)15N(α,γ)19F reaction chain in the asymptotic giant branch stars [1-2]. For that reason, the studies of the abundance of 19F can be useful as a probe of stellar nucleosynthesis [1,3].
Several experimental groups also have been studied the properties of levels in 19F nuclei [1,4,5]. The aim of these studies was the knowledge of cluster structure in N>Z nuclei. Still, the information on the alpha cluster structure of 19F is scarce because of the experimental difficulties of the studies of elastic scattering of alpha particles at a gas target at low energy in the backward hemisphere [4].
We made the measurements of the 15N+α elastic scattering using the Thick Target Inverse Kinematic [6] method in a broad angular range including 180 degrees in c.m.s. at heavy ion accelerator DC-60 [7-8] (Nur-Sultan, Kazakhstan) and analyzed the available experimental data using R-matrix formalism [9]. This study presents a comprehensive analysis of the experimental data and reveals an interesting relation between level structure in 19F and 20Ne.
Fig.1. demonstrates the quality of the new fit for θc.m. = 149.5 [4] in the energy range 2.0-4.4 MeV.

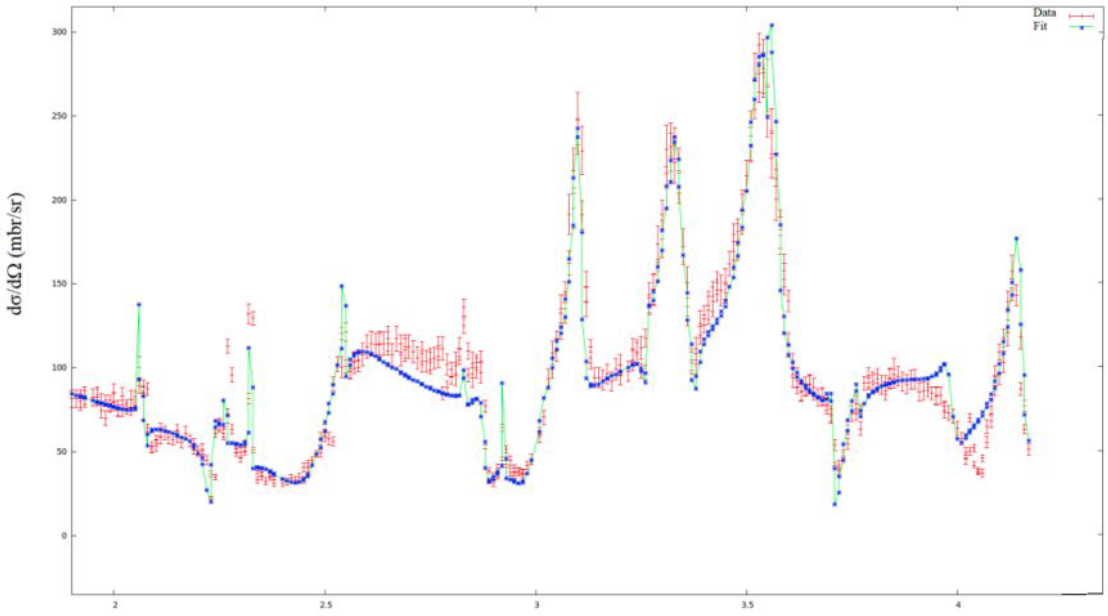

Figure 1: The excitation function for the 15N(α, α)15N elastic scattering. The blue points are the R-matrix fit.

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