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Investigation of heavy-ion fusion reaction with formation of medium mass nuclei at low energies

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In low-energy nuclear reaction physics the interactions of 12C, 16O nuclei play an important role at the studies of the stellar nucleosynthesis. The low interaction energies (which are relevant for the processes occurring in the stars) lead to significant difficulties in describing the fusion reaction mechanism for these nuclei. The main problem in this case connected with the resonance structure [1] of studied nuclei and the lowering of the reaction cross section due to the hindrance effect [2].
In this work, the recently proposed approaches [3] were used to describe resonances in the framework of the potential model. The decrease of the cross-section due to hindrance effect was taken into account and the results for possible position of the astrophysical S-factor maximum were obtained using the R-matrix approach with account for the resonances.

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