

## Correlation studies of the Helium-7 excited states

Recently, there has been significant progress in the use of ab initio approaches for theoretical studies of nuclear structure, which is why there is increasing interest in the structure of 1p shell nuclei, the description of which is an important test of ab initio approaches. Such nuclides include the unbound nuclear system  ${}^7\text{He}$ .  ${}^7\text{He}$  has been studied many times since its discovery in 1967, however, an unambiguous description of its structure has not yet been obtained.

In a recent experiment conducted at the FLNR JINR [1,2], where the  ${}^7\text{He}$  was studied in the  ${}^2\text{H}({}^6\text{He}, {}^1\text{H}){}^7\text{He}$  reaction, correlation data were obtained from which new information about the structure of  ${}^7\text{He}$  can be obtained. In the report, using a quite simple model, we will consider the effects of alignment and interference in direct reactions; present the results of an extended analysis of data from [2] and consider possible explanations for the observed correlations of the  ${}^7\text{He}$  decay products. The prospects of this approach for studying the  ${}^7\text{He}$  and other nuclear systems will also be discussed.

[1] A. A. Bezbakh, et. al., Int. J. Mod. Phys. E 33, 2450002 (2023).

[2] M. S. Golovkov, et. al., Phys. Rev. C 109 L061602 (2024)

### Section

Nuclear physics (Section 1)

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