**REVIEW on the project**

**"Development of the tagged neutron method for identification of the elemental structure of a substance and the study of nuclear reactions"**

The presented project is a good example of a combination of fundamental and applied research. Moreover, speaking of the applied component, we do not mean the principal possibility of its implementation, but already existing and developed methods and techniques, which, in turn, have found wide application in the industry (detection of diamonds, determination of elemental composition of rocks) and in everyday life (ensuring the safety of public places and transportation). The objectives of this project also include the expansion of the use of the tagged neutron method to improve existing nuclear data, primarily for the nitrogen, oxygen, carbon, silicon and phosphorus nuclei, which are of primary interest for their practical use. These data are necessary to create a reference database for identifying complex chemicals that are part of the rock.

Fundamental research in the framework of the project includes the study of angular distributions of γ-rays and neutrons produced in the inelastic neutron scattering reactions with energy of 14 MeV on the nuclei of the above chemical elements, as well as the measurement of excitation cross sections for a number of nuclear levels. At present, these data are rather fragmentary and incomplete. The study of reactions at light nuclei participating in stellar cycles will help to correctly describe the picture of the primordial nucleosynthesis and nucleosynthesis of stars. These studies are extremely important from the point of view of developing a model of combustion and the evolution of stars.

In particular, the implementation of the project involves: measuring the parameters of the 9Be (n, n'γ) 9Be reaction with the excitation of a 2.43 MeV level; study of the 10B (n, 2n) 9B reaction with an attempt to detect the lowest excited energy level of the 9B nucleus in the 1/2+ state. Experimental observation of the lowest excited energy level of the 9B nucleus can explain the low observed abundance of 7Li in comparison with the calculated one.

The research team has a high scientific potential and has the necessary equipment, experience in conducting experiments on neutron beams and analyzing experimental data. The project presents a justification for expanding the experimental base - both through the use of new neutron and gamma-ray detectors, and more sophisticated electronics. Undoubtedly, this will lead to a successfully realization of the project by the team.

I propose to approve the project.

Project evaluation:  
A - Scientific, methodological or technical importance (in the range of 0-10 points): 8 points;  
B - Competitiveness (in the range of 0-5 points): 5 points;  
C - Project implementation probability (in the range of 0-1 point(s)): 1 point;  
D - Compliance of resources to Project importance (in the range of 0-1 point(s)): 1 point;  
E - Qualification of the authors and personnel availability (in the range of 0-5 points): 5 points;  
F - Total score (in the range of 0-20 points): 18 points;  
  
  
Head of a sector of DLNP JINR

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