

## **REVIEW**

**from prof. Georgi Teoharov Tuparov, PhD**  
**New Bulgarian University, Department of Informatics**  
**professional field 4.6 Informatics and computer sciences**  
**on the scientific works presented for participation in the competition for the**  
**academic position "Associate Professor" in the field of higher education:**  
**4. Natural sciences, mathematics and informatics,**  
**professional field: 4.6 Informatics and computer sciences for the needs of the**  
**department of Informatics at the New Bulgarian University (NBU)**  
**published in the State Gazette no. 26/21.03.2023 г. and on the NBU website.**

The review is written by **Prof. Georgi Teoharov Tuparov, PhD, from Department of Informatics of New Bulgarian University** as a member of the Scientific Jury for the competition, established by Order No. 3-PK -193 / April 28, 2023 of the Rector of the NBU.

The only applicant who has applied for the position is **Stoyan Raykov Mishev, PhD** from Department of Informatics of the NBU.

### **I. DESCRIPTION OF THE PRESENTED DOCUMENTS**

#### **1. Information concerning the documents**

The presented set of documents - references, papers, etc. meet the requirements of ZRASRB, the Regulations for its application and the Ordinance for the development of the academic staff of the NBU.

To participate in the competition, the only applicant, Dr. Stoyan Mishev, submitted a list of 11 scientific works, including three publications in group B instead of monographic work and eight in group Г. All publications are indexed in Scopus and Web of Science (WoS). Additionally, the following documents are submitted: application for participation in the competition; CV; diplomas for master and doctor; a list of the scientific works with which he

participated in the competition, as well as their summaries; a certificate showing the fulfillment of the minimum national requirements and the corresponding evidence; reference to cover the specific requirements of NBU for occupying the academic position of associate professor, reference to the citations with a full bibliographic description; author reference of the contributions in the scientific works submitted for the competition; the full text of scientific publications and their summaries in Bulgarian and English.

## **2. Information for the applicant**

Dr. Mishev completed his higher education at Sofia University "St. Kliment Ohridski", majoring "Physics", specialization "Theoretical and Mathematical Physics" in 2002. From 2002 to 2004, he worked as a software engineer. From 2004 to 2017, he was a research associate at the Joint Institute for Nuclear Research (JINR), Dubna, Russian Federation (RF). Since 2018, he has been working on a basic employment contract in the department of Informatics of the NBU, initially as an assistant and then as a head assistant professor.

In 2011, he defended a dissertation on the topic "Ground-State Correlations and Structure of the Low-Lying States in Odd-Even Spherical and Transitional Nuclei" for the acquisition of the scientific degree "candidate of physical and mathematical sciences" at JINR, Dubna, RF, recognized and registered in NACID as PhD in professional field 4.1 "Physics" from Sofia University "St. Kliment Ohridski".

## **3. General characteristic of the scientific works and achievements of the applicant**

Dr. Mishev participated in the current competition with 11 scientific works, which are indexed in Scopus with SJR and/or in Web of Science (WoS) with IF. Scientific works B1,  $\Gamma$ 1, and  $\Gamma$ 2 are Q1;  $\Gamma$ 3 is in Q2;  $\Gamma$ 4 and  $\Gamma$ 6 are in Q4 of WoS. Scientific works B2, B3,  $\Gamma$ 5,  $\Gamma$ 7, and  $\Gamma$ 8 are indexed in Scopus with SJR. Scientific works in group **B** instead of monographic work meet the requirements of ZRASRB, the Regulations for its application.

I accept the presented evidences about the specific requirements of NBU (groups  $\mathcal{K}$ , 3, and E) for acquiring the academic position "Associate Professor" in Professional field 4.6 "Informatics and Computer Sciences".

The scientific papers accepted for review are co-authored, but to me this is evidence of the applicant's teamwork skills. The citations of the scientific works with which the applicant

participates in the competition are in publications indexed according to the requirements of the Bulgarian law about Academic Development and are not self-citations.

Scientific works and citation presented by the applicant for reviewing are not used in the previous procedures for PhD or other promotion. In addition, I do not find any information about plagiarism in the presented works.

The table below shows that the presented scientific works meet the minimum national requirements (under Art. 2b, para. 2 and 3 of ZRASRB) (groups A, Б, Г, and Д) and respectively the specific requirements of NBU (groups Ж, З, and E) for acquiring the academic position "Associate Professor" in Professional field 4.6 "Informatics and Computer Sciences".

Group	A	Б	В	Г	Д	Е	Ж	З	И
Minimal points required	50	-	100	200	50	-	50	70	50
Applicant claims	50	-	135	357	264	-	80	110	75
Acknowledged by the reviewer	50	-	135	357	264	-	80	110	75

#### **4. Characteristics and evaluation of the teaching activity of the applicant**

According to the documents provided to me, Dr. Mishev's teaching activity began in 2018 in the "Informatics" department of the NBU and continues until now. According to the presented reference, he leads numerous courses in the bachelor and master programs of the department of "Informatics", the subject of which coincides with the professional field of the competition.

#### **5. Analysis of the scientific achievements of the applicant contained in the documents and publications presented for the competition**

As I noted above, the scientific works submitted for participation in the competition are co-authored. Due to the lack of separation protocols for them, I assume that the candidate's participation in them is equal to the other authors, which, however, does not reduce the significance of the achieved results. Since the candidate did not present his claims for scientific and scientific-applied contributions in the competition topic with sufficient precision, I will allow myself to formulate them in the following way:

**Thematic field „ Computer modeling of the photon vacuum state (Papers B1 and B2).**

An application of the variation method for determining ground states of fermionic systems with a small, even number of particles has been developed and tested. A comparison was made with solutions in the Lipkin-Meshkov-Glik model. Computer programs have been developed using libraries for numerical and symbolic calculations. For this purpose, software packages have been adapted for implementations of numerical methods for solving non-linear algebraic equations, an eigenvalue problem, as well as symbolic calculation of expressions based on Clifford's algebra.

**Thematic field "Computer modeling of the Pygmy dipole resonance using beta decay" (Papers  $\Gamma 1$  and  $\Gamma 4$ )**

In this thematic direction, the main contributions of the applicant are in the development and testing of a model of excitation of Pygmy dipole resonance in atomic nuclei through beta decay of neighboring nuclei, which was subsequently implemented as a specialized software product. Large-scale calculations were made with it, which prove the adequacy of the model.

**Thematic field „Computer modeling of ground-state correlations and structure of low-lying states in odd-even atomic nuclei“ (Papers  $\Gamma 2$ ,  $\Gamma 3$ ,  $\Gamma 5$ , and  $\Gamma 6$ )**

Based on a well-defined model for describing low-lying states in odd-even spherical and transition nuclei with the inclusion of correlations between nucleons in the ground states of their constituent even-even "nuclei", a special software architecture has been created. A hierarchy of classes modeling quantum states generated by other states from the hierarchy is developed, as well as implemented, modifiable objects implementing the numerical calculations to obtain the characteristics of the states.

**Thematic field „Application of modern computer technology to solve equation of state of infinite nuclear matter“ (papers B3,  $\Gamma 7$ , and  $\Gamma 8$ )**

A special software product has been developed for solving a system of a large number of related algebraic equations that involve multiplication (contractions) of tensors of the fourth rank or higher, aimed at using the graphics processors with a streaming multi-core architecture and vectorized operations, which means - greatly speed up calculations of this type. The achieved practical results show a multiple speedup in calculations compared to similar ones carried out using a central processor.

## **6. Critical remarks and recommendations**

Apart from the insufficiently precise formulation of claims for scientific and scientific-applied contributions, I have no other objections to the applicant.

I take the liberty of recommending Dr. Mishev to continue publishing mostly in indexed publications specialized in the field of computer science.

## **7. Personal impressions for the applicant**

I know the candidate personally and have good impressions of his work in the department of Informatics.

## **8. Conclusion for the application**

After analyzing the documents presented in the competition, scientific works and contributions in them, I confirm that the applicant fully meets the requirements of ZRASRB, its regulations and Ordinance for the development of the academic staff of the NBU for the academic position of "Associate Professor" in the Field of higher education 4. "Natural Sciences, Mathematics and Informatics", Professional field 4.6 "Informatics and Computer Sciences". In particular, the applicant satisfies the minimal national requirements for the scientific field and there is not a plagiarism in the presented works for the competition.

I give my positive conclusion for the election of Dr. Stoyan Raykov Mishev for the academic position "Associate Professor" under the current competition.

## **II. GENERAL CONCLUSION**

I recommend the Scientific Jury to suggest to the Academic Council of the New Bulgarian University to elect Dr. Stoyan Raykov Mishev for the academic position "Associate Professor" in the Professional field 4.6 "Informatics and Computer Sciences".

30.07.2023 г.

Reviewer:

(prof. Georgi Tuparov, PhD)