

# OPINION

of Prof. Stoytcho S. Yazadjiev  
Faculty of Physics, Sofia University "St. Kliment Ohridski"  
4.1. Physics  
for evaluating the academic achievements of the only candidate

Assistant Professor **Stoyan Raykov Mishev, PhD**

for position of Associate Professor in the field of Informatics and Computer Science

## **I. Assessment of compliance with the minimal national requirements and the requirements of the New Bulgarian University**

Ch. Assistant Professor Stoyan Mishev, Ph.D., fulfills the minimal national requirements for scientific and teaching activities for Higher Education Area 4. Natural Sciences, Mathematics and Informatics, Professional Direction: 4.6. "Informatics and Computer Sciences", defined by the Regulations for the Implementation of the Law on the Development of the Academic Staff in the Republic of Bulgaria, as well as the requirements of the Ordinance on the Development of the Academic Staff of the NBU and Appendix 2, Minimum National Requirements and Requirements of the NBU, required to hold the academic position of "associate professor".

In the following table are listed the required and recognized points of the candidate :

<b>Group of</b>	<b>Required</b>	<b>Recognized</b>
A	50	50
Б	0	0
B	100	135
Г	200	357
Д	50	264
E	0	0
Ж	50	65
З	70	110

И	50	75
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**Group A: 50 points**

S. Mishev has defended a candidate (PhD) degree at the Joint Institute for Nuclear Research in Dubna, Russia titled "Ground state correlations and structure of the low-lying states in odd-even nuclei". The diploma is recognized in Bulgaria by a decision of the academic council of the Sofia University "St. Kliment Ohridski" in the fall of 2018 and is registered in NACID.

**Group B: 135 points**

As a habilitation work the candidate presents the following publications indexed in Scopus and Web of Science:

1. S. Mishev, "Structure of the phonon vacuum state", Physical Review C 87 (6), 064310 (2013) <https://www.webofscience.com/wos/woscc/full-record/WOS:000320608700003> Q1,
2. S. Mishev, The phonon vacuum state in a Lipkin model, J.Phys.Conf.Ser. 533 (2014) 012013, <https://www.webofscience.com/wos/woscc/full-record/WOS:000346180900013>
3. Stoyan Mishev, "Coupled-cluster calculation of neutron matter equation of state ", 2022 J. Phys.: Conf. Ser. 2255 012006, doi:10.1088/1742-6596/2255/1/012006

**Group Г: 357 points**

The candidate presents eight works indexed in Scopus and Web of Science which give 357 points according to the respective counting rules.

**Group Д.11: 264 points**

The candidate presents 34 citations which gives 264 points according to the respective counting rules.

**Group Ж: 65 points**

21. Research program

The research interests of the candidate are mostly in the fields of theoretical and mathematical physics, whilst recently he develops ideas and applies methods from theoretical physics to machine learning.

22. Membership in national and/or international organizations and associations in the relevant

professional direction

The candidate is a member of the Union of Mathematicians in Bulgaria; Union of Physicists in Bulgaria; Automation and Informatics Union.

26. Participation in research or creative projects beyond those specified in indicators 15 and 16.

He is the management board chairman of the "Institute for Advanced Physical Studies".

29. Initiation/active participation in the creation of a successfully launched new program

Following his initiative the Master Program "Knowledge Discovery and Big Data Analytics" has started and develops successfully at NBU

30. Participation in program improvement and development of courses to programs

The candidate teaches courses in many programs initiated by the Computer Science Department at NBU, as well as OOOK and GENB. These courses can be tracked in Moodle NBU.

31. Organization and conduct of a scientific school

In the period 2018-2021 the candidate organized four schools "Astronomy and astrophysics".

**Group 3:** 110 points

34. Average grade from the student satisfaction surveys for the courses and teacher over 4.00

The average score from the student surveys is 4.46

35. Author's educational materials for at least one course in book form and/or in "Moodle NBU".

Most of the courses of the candidate are developed by him. They are available in "Moodle NBU"

36. Joint work with students in research and/or creative collectives

The candidate has joint publications with students. Assists students in attending scientific forums and participation in scientific projects.

37. Guidance/reviews of successfully defended graduates or participation in state examination committees

The candidate takes part in state examination committees and supervises successfully defended diploma works.

Academic mentor of four students from NBU under the "Student Internships - Phase 1" program financed by OII HOIP

**Group II: 75 points**

43. Fulfillment of academic obligations

The candidate fulfills all academic obligations.

44. Participation/management of a project for which external funds and/or NBU students have been attracted

The candidate leads the project "Astrophysical constraints on neutron matter equation of state based on effects of modern high-precision realistic nuclear potentials beyond two-body interactions", Bulgarian Science Fund of the Ministry of Education and Science of the Republic of Bulgaria under contract No. KP-06-H-38/12 from 06.12.2019.

45. Participation in committees at the faculties

Participates in commissions at the Bachelor and Masters Faculty at NBU for the defense of student theses.

46. Participation in Program Council, Faculty Council and/or Academic Council

Member of the Program Board of the bachelor's program in Informatics.

48. The candidate has no LC penalties

**II. Research activities and results**

The main scientific contributions of the candidate are in the following areas:

1. Structure of the phonon vacuum state;
2. Excitation of pygmy resonance via beta decay in neighboring nuclei;
3. Ground state correlations and structure of low-lying states in odd-even nuclei;
4. Equation of state of infinite nuclear matter.

The candidate also has unpublished reports on theoretical aspects in machine learning.

In most of his publications the candidate presents a model of a physical system based on quantum mechanics. These models are applied mostly using numerical calculations, and realized using computer programs executed on different hardware architectures. In this respect Dr. S. Mishev shows substantial skills and his results in theoretical physics are also due to his knowledge and mastery in high performance computing.

### **III. Learning and teaching activity**

The candidate teaches courses in physics, machine learning, quantum computers and other. The educational material in his Masters program courses contain topics which are very modern and yet not developed conceptually.

### **IV. Administrative and public activity**

The candidate is a member of the Program Council of the bachelor's program in Informatics.

### **V. Personal impressions of the candidate (if any)**

My personal impressions of the candidate are that he has a broad spectrum of interests in the areas of theoretical physics and also in machine learning. His research is original and although the solutions of the scientific problems in front of him are not always obvious he pursues obtaining convincing results. I know some master students who are supervised by him and I think that they learn a lot working on the research topic together with the candidate which gives them a good start in building a future career in science.

### **VI. Opinions, recommendations and notes on the activity and achievements of the candidate**

The only recommendation I would give the candidate is to publish in scholarly journals the results already reported at conferences related to the application of machine learning in physics.

### **Conclusion**

After having familiarized myself with the documents presented in the competition, the scientific publications and the contributions in them, I believe that the candidate, **Assistant Professor Dr. Stoyan Mishev** fully meets the requirements of ZRASRB, PPZRASRB and the Ordinance on the development of the academic staff of NBU for the occupation of an academic position " **Associate**

**Professor**" in the field of higher education 4. Natural sciences, mathematics and informatics, professional direction 4.6 Informatics and computer sciences.

Based on the above, I recommend the scientific jury to propose to the Academic Council of the New Bulgarian University to choose **Assistant Professor Dr. Stoyan Mishev** to take the academic position "**Associate Professor**" in professional direction 4.6 Informatics and computer sciences.

Date 28.07.2023

Signature .....

