

**OPINION**  
**in a competition for the academic position**  
**"Associate Professor"**  
**in the professional field 4.1 Physical sciences (General physics),**  
**for the needs of the Faculty of Physics of Sofia University "St. Kliment Ohridski",**  
**announced in State Gazette No. 21 of 15.03.2022**

The opinion is prepared by prof. Victor Genchev Ivanov, DSc, from the Faculty of Physics, Sofia University, in his capacity of a member of the scientific jury on the competition, according to Order № 38-248 / 20.05.2022 of the Rector of Sofia University.

Documents for participation in the competition have been deposited by a single candidate Gergana Emilova Aleksieva, PhD, currently working as a senior assistant professor at the Faculty of Physics of the Sofia University.

## **I. General description of the submitted materials**

### **1. Details of the application**

The documents submitted by the candidate in the competition comply with the requirements of ZRASRB, PPZRASRB and the [Regulations on the terms and conditions for acquiring scientific degrees and holding academic positions at Sofia University "St. Kliment Ohridski"](#).

The candidate Gergana Aleksieva presented a list of a total of 19 publications in Bulgarian and foreign scientific journals for participation in the competition. There are also 17 other documents (in the form of official notes and certificates from the employer, project manager, funding organization or project assignor, references and feedback, awards and other relevant evidence) supporting the applicant's achievements.

The documents are designed precisely and give a clear idea of the research and teaching activities of the candidate.

### **2. Details of the candidacy**

Gergana Aleksieva obtained a higher education, equivalent to Master's degree with a five-year course of study, in 1997 at the Faculty of Physics of Sofia University "St. Kliment Ohridski" with a major in Physics and a specialization in Solid State Physics. The average score of her semester exams is 5.47, and Excellent 6 from the thesis defense. From 1998 to 2000 the candidate completed two one-year specializations at the Technical University in Munich with the topic "Biosensors" (in the Faculty of Physics) and "Gas permeability of polymer layers" (in the Faculty of Chemistry).

Gergana Aleksieva was enrolled in full-time doctoral studies at the Faculty of Physics of Sofia University in 1998 and was expelled with the right to defend in 2002. The candidate acquired PhD degree in 2013 after defending a dissertation entitled "Acoustic properties and applications of polymeric materials". From 2003 to 2013 the candidate worked as an assistant at the Department of Solid State Physics and Microelectronics at the Faculty of Physics, and after defending his doctoral dissertation until now – as a senior assistant at the Department of Condensed Matter Physics and Microelectronics, and subsequently – in the Department of General Physics.

Gergana Aleksieva's professional activity is related to conducting seminars and laboratory exercises and lecturing in nearly 20 different disciplines, both bachelors and masters. She is the author of three tutorials for laboratory exercises. Throughout the period of work at the Faculty of Physics, the candidate actively participates in research work.

The candidate is fluent in three foreign languages – English, Spanish and Russian.

### **3. General assessment of the scientific works and achievements of the candidate**

The candidate's research activity follows thematically the field of her doctoral dissertation – acoustic, acousto-optical and optical properties of bulk materials and thin-layer coatings related to the development of sensor systems, as well as the topic of her specialization at TU Munich related to gas permeability / absorption of thin films. In general, the candidate's scientific profile is positioned in materials physics and applied physics.

For the entire scientific career, the candidate has an asset of 25 publications in refereed international journals with impact-factor or impact- rank, all of which fall into quarters of SJR. There are also 12 reports from national or international scientific conferences, published in full in publications without impact factor. To participate in this competition, the candidate has submitted 19 articles in peer-reviewed and indexed journals published after 2015, i.e. not repeating works for obtaining the PhD degree or for holding the last senior assistant position. It is clear from the attached reference (Document 12), the lists of publications and the citation report that the applicant fully meets the minimum national requirements under Art. 2b, paragraphs 2 and 3 of ZRASRB.

Table 1 compares the additional requirements of the Faculty of Physics of Sofia University for acquiring the academic position of "Associate Professor" and the personal indicators of the candidate.

**It is clear from the presented data that the candidate fully meets the additional requirements of the Faculty of Physics for the academic position of "Associate Professor".**

**Table 1.** Comparison between minimal requirements of the Faculty of Physics of SU for holding the academic position of "Associate professor" with the personal indicators of the candidate.

| <b>Additional requirements of the Faculty of Physics</b>                                      | <b>Candidate's indicators</b>   |
|---|---|
| At least 7 Group-I publications, at least one of which has been published in the last 3 years | 12 Group-I publications (15 cumulative), of which 4 have been published in the last 3 years             |
| Minimum 50 independent citations  | 52 independent citations  |
| Significant contribution to at least 4 Group-I publications                                   | 4 Group-I publications with significant contribution  |
| H-index of at least 5   | 5   |
| Supervision of at least one successfully defended diploma work                                | 2 successfully defended diploma works   |
| Coordinator and / or participation in international and / or national research projects       | Coordinator of 1 national project, participant in 1 international and 4 national projects               |
| Teaching experience equivalent to at least 2 years full-time employment at Sofia University   | Teaching experience of 19 years in the Faculty of Physics of Sofia University with full-time employment |

#### **4. Evaluation of the teaching activity of the candidate**

The list of courses in which the candidate has given exercises or lectured in the last 19 years is impressive:

Basic computer knowledge - practicum; Condensed Matter Physics - seminar; Crystallography and Crystal Physics - seminar; Polymers in microelectronics - workshop; Acoustic and optical waves in a solid body - practicum; Electricity and magnetism - practicum; Optics - workshop; Physics - practicum; Programming and computational physics - workshop; Modern experimental methods - practicum; Introduction to programming - workshop; Physics of wave processes - lectures and seminar; Basics of acoustics - lectures; Computer methods for data processing - workshop; Geometric optics - workshop; Medical statistics - workshop; Medical statistics. Data processing - workshop; Introduction to astronomical optics - workshop; Computer modeling in optics - workshop; lectures in physics for the course "Physics and Biophysics" for the specialty Pharmacy; Physics - lectures (specialty Biology, specialization);

This list unambiguously shows that the candidate is a teacher with extensive experience and competence both in more specialized fields, corresponding to her scientific profile, and proves a broad general culture in physics.

## **5. Analysis of the scientific and scientific-applied achievements of the candidate contained in the materials presented for participation in the competition**

The scientific work of the candidate can be divided thematically into two large groups:

1) construction of sensors and study of the physical characteristics of materials by acoustic and acousto-optical methods;

2) study of the optical properties of new materials.

The main part of the scientific activity of the candidate is the development of gas sensors based on the method of quartz microbalance (QCM - quartz microbalance) as presented in publications 1-3, 9, 14, 17, 19. The idea of QCM is detecting of small changes in resonant characteristics of a quartz resonator due to deposition of a thin layer of the analyte under study. The relevance of the topic for the ecological and toxicological control in a highly reactive environment is widely recognized in the literature and is evidenced by the fact that five of these articles have been published in journals of the first or second quartile (group-I of the FzF classification).

The optical and acoustic properties of  $\text{As}_2\text{Se}_3\text{-Ag}_4\text{SSe-PbTe}$  and  $\text{Bi}_{12}\text{SiO}_{20}\text{:Fe}$  glasses are the subject of papers 7, 8, 10, 11,12. Another group of works – 4, 6, 15, 17, are dedicated to the structural and optical characterization of thin layers of  $\text{ZnO}$  and  $\text{ZrO}_2$ .

The role of the candidate in the presented publications is related to the design of the experiment, data processing and analysis, contribution to the text writing, and in some of the articles the candidate is initiator of the research or a corresponding author.

The topics of the presented research show that the candidate is fluent in modern acoustic and optical methods for the study of solid materials and polymers and knows basically the interaction between gas and solid phases.

All publications submitted for participation in the competition are in peer-reviewed international journals of high impact. This proves the original nature of the candidate's scientific contribution and categorically excludes any form of plagiarism.

## **6. Critical remarks and suggestions**

I don't have critical remarks or suggestions.

## **7. Personal impressions from the candidate**

I know Gergana Aleksieva in the capacity of a head of the Department of General Physics, where she has been working as a senior assistant since 2019. My personal impressions of the candidate are entirely positive. Gergana Aleksieva approaches her teaching activity responsibly, skillfully balancing between the accessible presentation of the taught material to students of non-physical majors and a sufficiently demanding attitude to the performance of students' duties - attendance, protocols, participation in colloquia and tests. The candidate actively participates in the organizational life of the department – department councils, discussion of curricula, technical assistance in setting the practical exercises, etc.

Based on my personal impressions of the work of Gergana Aleksieva, I am convinced that she is the right candidate for the academic position of "Associate Professor" at the department.

## **8. Conclusions for the candidature**

After getting acquainted with the materials and scientific works presented in the competition, and on the basis of the analysis of their significance and the scientific and scientific-applied contributions contained in them, I confirm that the scientific achievements meet the requirements of ZRASRB, the Regulations for its application, and the respective Regulations of Sofia University "St. Kliment Ohridski" for holding the academic position "Associate Professor" in the scientific and professional field of the competition. In particular, the candidate satisfies the minimum national requirements in the professional field and no plagiarism has been established in the scientific papers submitted at the competition.

After having acquainted with the materials and scientific works presented in the competition and I give my **positive** assessment of the candidacy.

## **II. GENERAL CONCLUSION**

Based on the above arguments, I recommend the scientific jury to propose to the Faculty council of the Faculty of Physics at Sofia University "St. Kliment Ohridski" to elect Gergana Emilova Aleksieva to the academic position "Associate Professor" in the professional field 4.1 Physical Sciences (General Physics)

Prepared on 28.06.2022 г.

By: prof. Victor Ivanov, D.Sc.