

STATEMENT

on a competition for an academic position "Professor"
Professional field 4.1 Physical Sciences (Physics of Atoms and Molecules)
for the needs of Sofia University "St. Kliment Ohridski" (SU),
Faculty of Physics, announced in State Gazette No 24 of 17.03.2023.

The statement is prepared by Prof. Dr. Petko Stoev Petkov, as a member of the scientific jury in the competition in the professional field 4.1. Physical Sciences (Physics of Atoms and Molecules), according to the Order No. RD-38-174/20.04.23 of the Rector of Sofia University.

Only one candidate submitted documents for participation in the announced competition: Associate Professor Stanislav Balushev Balushev, Faculty of Physics, Sofia University »St. Kliment Ohridski«

I. General description of the presented materials

1. Application data

The documents submitted by the candidate in the competition meet the requirements of the national Law and the Regulations for acquiring scientific degrees and occupying academic positions at SU "St. Kliment Ohridski." The candidate, Stanislav Balushev, has submitted a list of 25 scientific publications in foreign scientific journals, one book chapter, and 35 participations in scientific forums, including poster presentations, oral presentations, plenary and invited talks. The candidate has also participated in 4 national projects, 1 international scientific project, and has served as the head of 2 national and 3 international scientific projects. I have no objections to the applicant's documents.

2. Details of the applicant

Stanislav Balushev was born in 1965 in Sofia, Bulgaria. He completed his Master's degree in 1990 at the Faculty of Physics, Sofia University. Later, he defended his PhD in 1998, habilitated in 2009, and earned his "Doctor of Science" degree in 2021. In Bulgaria, the candidate worked as an assistant and senior assistant professor at TU-Sofia from 1991 to 1992 and from 1995 to 2003, respectively. Since 2009, he has held the position of Associate Professor at the Department of Optics and Spectroscopy, Faculty of Physics, Sofia University. Assoc. Prof. Balushev has also held research positions abroad, funded by DAAD as a PhD student, Marie Curie Foundation postdoctoral fellowships, and Feinberg Fellowship. Notably, he served as the group leader of the "Photophysical Chemistry Group"

at the Max-Planck Institute for Polymer Research in Mainz, Germany, for nearly 8 years. He has authored and co-authored 78 scientific publications and has contributed to the production of 16 patents. Assoc. Prof. Balushev has an H-index of 26 (Web of Science database).

3. General characteristics of the candidate's scientific works and achievements

According to the data provided in Table B.5, Assoc. Prof. Balushev meets the minimum national requirements of the Law and the additional requirements of SU "St. Kliment Ohridski" for the academic position of "Professor" in the scientific field and professional direction of the competition. The scientific works presented by Assoc. Prof. Balushev, as shown in Table B.3, demonstrate clear distinctions in the procedures for acquiring scientific degrees (Doctor and Doctor of Sciences) and academic positions (assistant prof., senior assistant prof., and associate prof.). Assoc. Prof. Balushev's scientific contributions are divided into 6 scientific directions (Π1-Π6). Given the significant overlap between Π5 and Π6, I believe that the scientific contributions of Assoc. Prof. Balushev can be grouped into the following 5 scientific directions: 1) Molecular design and synthesis of blue-emitting organic semiconductor molecules; 2) Synthesis of dyes with original structures and specific properties for optical testing of physiological indicators in biological objects; 3) Synthesis of organic dyes with photoinduced isomerization at low optical pump intensities; 4) Chemical compounds with residual or delayed fluorescence; 5) Triplet-triplet annihilation with up-conversion in multicomponent/complex organic media.

4. Evaluation of the candidate's teaching activity

From 2017 to 2022, Assoc. Prof. Balushev fulfilled and exceeded the teaching load requirements of Sofia University. Additionally, he has supervised 5 diploma theses, 3 full-time PhD students, and one part-time PhD student. For the last 6 years, he has been the head of the Laboratory of "Organic Optoelectronics" at the Faculty of Physics, Sofia University.

5. A substantive analysis of the candidate's scientific achievements

The contributions defined as Π1, Π3 and Π4 can be defined as new methods and methodology for the development/design and synthesis of specific semiconductor molecules and organic dyes, as well as enrichment of existing knowledge in the field. The synthesis of a 2,7-capped polypyrene with 4 aryl groups capable of emitting light with wavelength of 429nm is reported for the first time. The photophysical characteristics of a blue-emitting polymer synthesized in the group were also investigated. The synthesis of fully organic dyes, without rare earths or noble metals, exhibiting photoinduced isomerization is another branch

of the fundamental research of the group of Assoc. prof. Balushev. A whole family of dyes demonstrating photoisomerization (E-Z) at very low excitation intensities has been synthesized. On the other hand, the P2, P5, P6 contributions of the candidate can be distinguished as the application of scientific achievements in practice. A successful synthesis of a new family of merocyanine dyes with a highly pronounced solvatochromism has been carried out, which allows the presence of methyl and ethyl alcohol in aqueous media to be determined optically. This allows the creation of a minimally invasive technology for monitoring and controlling physiological parameters in cell cultures. Another family of newly synthesized monomethine-cyanine dyes show better binding characteristics to double-stranded DNA than the commercially available dye thiazole orange. The study of triplet-triplet annihilation processes with up-conversion in complex organic media has been strongly emphasized in the research of Assoc. prof. Balushev. The application of the triplet-triplet annihilation process with up-conversion as a fully optical testing mechanism for the physical parameters of biological objects is well demonstrated. The scientific works of Assoc. prof. Balushev, included in the competition, have been published in specialized international scientific journals. In the last two years 2021-2022 assoc. prof. Balushev is the lead researcher in 6 of the publications submitted to the competition, and a total of 9 of them are after the defense of the dissertation for “Doctor of sciences” degree. The citations on the publications submitted to the competition are over 400, which indicates the relevance of the topic and the activity of assoc.prof. Balushev. H-index of the applicant is 26 (WoS). Contributions to individual scientific papers with more than one author are well separated in Table B.6. The scientific achievements of Assoc.prof. Balushev are also evidenced by the 16 patents in which he has been involved.

6. Critical comments and recommendations

I have no Critical remarks to the works of assoc.prof. Balushev. However there are some inaccuracies in the translation into Bulgarian, which have no bearing on the quality of the results.

7. Personal impressions of the candidate

My personal impressions of the candidate are excellent, he has excellent communication skills and can easily express and explain complex physical processes and phenomena.

8. Conclusion on the application

Having read the materials and scientific works submitted in the competition and on the basis of the analysis of their significance and the scientific and applied contributions contained

therein, I confirm that the scientific achievements meet the requirements of the Law , the Regulations for its application and the relevant Regulations of the University of Sofia "St. Kliment Ohridski" for the candidate to hold the academic position of "Professor" in the scientific field and professional field of the competition. In particular, the candidate satisfies the minimum national requirements in the professional field and no plagiarism has been found in the scientific works submitted for the competition.

I give my positive opinion of the application.

II. General Conclusion

On the basis of the above, I recommend the scientific jury to propose to the Faculty Council of the Faculty of Physics at Sofia University "St. Kliment Ohridski" to elect assoc. prof. Balushev for the academic position of "Professor" in the professional field 4.1 Physical Sciences (Physics of Atoms and Molecules).

12.07.2023.

Prepared by: Prof. Dr. Petko Petkov