

# REPORT

**on the competition for filling the academic position of *Professor*  
in the Professional Field 4.1 Physical Sciences (Physics of atoms and molecules)  
for the needs of Sofia University St. Kl. Ohridski, Faculty of Physics,  
announced in Official State Gazette, issue. 24 from 17.03.2023**

The report was prepared by Prof. Stanislav Rangelov, DSc, Institute of Polymers, Bulgarian Academy of Science, as a Jury member on the competition according to order № ПД-38-174 / 20.04.2023 г. of the Rector of Sofia University *St. Kl. Ohridski*

In the competition for filling the academic position of *Professor*, Assoc. Prof. Stanislav Balushev Balushev from the Faculty of Physics, Sofia University *St. Kl. Ohridski* is the only candidate.

## **I. General information about the procedure and the candidate**

### **1. Application data**

The documents submitted by the candidate for the competition correspond to the requirements of the Rules for acquisition of scientific degrees and academic positions in Sofia University *St. Kl. Ohridski*. In order to participate in the competition, the candidate, Associate Professor Stanislav Balushev, DSc, submitted lists of all his publications, patents, book chapters, invited lectures at scientific forums. Other documents for participation in projects, supervision of students and PhD students, citations, teaching activity, which support his achievements, are also presented.

The group I works – publications in journals falling into quartiles Q1 (63), Q2 (10) and world patents (16) – entirely dominate the list of titles. Several represent publications in conference proceedings (4) and book chapters (3). The total number of publications, as well as their particularly good acceptance in prestigious and influential journals and publishing houses (book chapters in various Springer publishing houses) as well as the atypically large number of world patents in which the applicant is a co-inventor, testify for active, consistent and undoubtedly successful research activity.

### **2. Applicant data**

Stanislav Balushev graduated from the Faculty of Physics, Sofia University *St. Kl. Ohridski* in 1990. In 1998, he defended his doctoral dissertation *Phase modulation of light beams. Dark space*

*solitons*. He has occupied academic positions of assistant, senior assistant in the Technical University of Sofia. Since 2009, he has been an *Associate Professor* at the Faculty of Physics of Sofia University *St. Kliment Ohridski*, and in 2021 he obtained a *Doctor of Science* degree in the same faculty with a dissertation on *Energy transport in optically-created densely populated organic triplet ensembles*. He has held positions of varying durations in universities and research organizations mainly in Germany, but also in Austria and Israel as a DAAD fellow, visiting researcher, and Marie Curie fellow. For a long period (2001 – 2009) he was also the group leader of the *Photophysical Chemistry Group* at the Max Planck Institute for Polymer Research in Mainz, Germany, well known in the "polymer" society in Bulgaria.

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

In the competition, the candidate participated with 26 scientific papers, which were placed in groups of indicators B (4) and  $\Gamma$  (22). In the four publications from the group of indicators B, the applicant's contribution is considered as substantial as he is the last or one of a total of three authors. In the rest of the scientific works, placed in the group of indicators  $\Gamma$ , he has declared his contributions such as carrying out research, analyzing experimental data, characterizing structures. Given the nature of the works, these contributions can be considered particularly important and key to the implementation of the relevant research.

The citation record shows more than 400 citations of the publications in the competition with the most cited paper being [Shin-ichiro Kawano, Ch. Yang, M. Ribas, S. Balushev, M. Baumgarten, and K. Müllen "Blue Emitting Poly(2,7-pyrenylene)s: Synthesis and Optical Properties", *Macromolecules* 41, 7933 – 7937, 2008. 10.1021/ma8017316.] with 55 citations. The total number of citations of the candidate's works is over 2,700, and the "gold" publications are at least 7. The candidate's Hirsch index is 28 (SCOPUS).

I find that the research papers are fully in accordance with the minimal national requirements of the Law for the Development of the Academic Staff of Republic of Bulgaria as well as the additional criteria for acquisition of the academic position of *Professor* in Sofia University and those of the Faculty of Physics for the Professional field *4.1 Physical Sciences*. The scientific works presented by the candidate do not repeat those from previous procedures for acquiring a scientific degree and academic position. There is no evidence of proven plagiarism in the scientific works submitted for the competition.

#### **4. Characteristics and assessment of the candidate's teaching activity**

The candidate has many years of teaching experience as a senior assistant and associate professor, both in Bulgaria and abroad. The number of teaching hours is more than 500 hours for each of the last 5 years. He has supervised one PhD thesis (successfully defended) and the theses of five students. Undoubtedly, the specifics of university teaching are well known to him.

#### **5. Analysis of the applicant's scientific and applied achievements**

There are several research directions in the research on which the candidate has worked. They can be outlined as follows:

- Molecular design of blue-emitting organic semiconductor molecules;
- Synthesis of dyes with an original structure for optical testing of physiological parameters of organic samples;
- Synthesis of organic dyes with photoinduced *trans-cis* isomerization;
- Study of processes of energy transfer and triplet-triplet annihilation up-conversion.

To solve these research problems a number of target compounds such as conjugated polypyrene, merocyanine dyes, cationic monomethine-cyanine dyes, styryl dyes, containing benzothiazole-crown ether, substituted porphyrins, nanocomposite materials and capsules, hybrid nanoparticles, polystyrene nanoparticles with organic and inorganic coatings, antibody-functionalized nanoparticles, and organogels. The candidate's contributions, as noted above, can be considered substantial and particularly important and key to the realization of the relevant research. In general, the character of the contributions could be formulated as *proving by new means substantial new aspects of already existing scientific fields, problems, theories and hypotheses*.

#### **6. Critical notes and recommendations**

I do not have any critical remarks regarding design, analyzes and summaries, methodology, accuracy and completeness of the results, and reference of the reviewed works. I believe, however, that the applicant's presentation of prospects for the development of his future research and research interest, as well as for his activity in the academic position of *Professor*, would be useful.

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

Without knowing the candidate personally, his name has been known to me for a long time and I associate him with a successful career of a young and promising (then) and already established

and prosperous (now) researcher and university scholar. I have direct impressions from his recent presentation of an invited lecture in the Colloquium of the Institute of Polymers - BAS, where my initial impressions were confirmed.

### **8. Conclusion on the application**

Having familiarized myself with the materials and scientific works presented in the competition and based on the analysis of their significance and the scientific and applied contributions, **I confirm** that the scientific achievements meet the requirements of the Law for the Development of the Academic Staff of Republic of Bulgaria and the Rules for acquisition of scientific degrees and academic positions in Sofia University *St. Kl. Ohridski* for acquisition of the academic position of *Professor* in the scientific area and professional field of the competition. In particular, the candidate satisfies the minimum national requirements in the professional field and no plagiarism has been detected in the scientific works submitted for the competition.

I give my **positive** assessment to the application.

### **II. GENERAL CONCLUSION**

Based on the above, **I recommend** the scientific jury to propose to the Faculty Council of the Faculty of Physics, Sofia University *St. Kliment Ohridski* to elect Associate Professor Stanislav Balushev Balushev, DSc to the academic position of *Professor* in professional direction 4.1 Physical Sciences (Physics of atoms and molecules).

July 13, 2023

Prof. Stanislav Rangelov, DSc