

## **REVIEW**

**in the competition for the occupation of the academic position "professor"  
in professional direction 4.1 Physical Sciences (General Physics),  
for the needs of Sofia University "St. Kliment Ohridski" (SU),  
Faculty of Physics announced in SG no. 24 of 17.03.2023**

The review is prepared by: Prof. Dr. Temenuzhka Atanasova Yovcheva - Plovdiv University "Paisiy Hilendarski", in the capacity of a member of the scientific jury for Physical Sciences (General Physics) competition according to Order No. RD-38-173/20.04.2023 of the Rector of Sofia University.

Assoc. Prof. DSc in Physics Veselin Todorov Donchev – Sofia University «St. Kliment Ohridski», Faculty of Physics, is the only candidate who has submitted documents to participate in the announced competition.

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

#### **1. Data on presented documents**

The documents submitted by the candidate in the competition correspond to the requirements of the Act on Development of the Academic Staff in the Republic of Bulgaria, Rules for Implementation of the Law on the Development of the Academic Staff in the Republic of Bulgaria, and the Regulations for the terms and conditions for acquiring scientific degrees and occupying academic positions at SU "St. Kliment Ohridski".

The candidate, Assoc. Prof. DSc in Physics Veselin Todorov Donchev has presented a list of 22 titles in total, including 16 publications in journals with IF and 6 publications in conference proceedings. The necessary number of other documents supporting the achievements of the candidate is also presented.

#### **2. Applicant's data**

Assoc. Prof. Veselin Todorov Donchev was born on September 11, 1959, in Sofia. He is married and has 2 children. He obtained his Master's degree in Physics at the Faculty of Physics of Sofia University "St. Kl. Ohridski" in 1985. In 1991 he defended a dissertation on the topic: "Investigation of electrical and optical properties of point defects in gallium arsenide" and obtained a PhD in Solid State Physics at the Faculty of Physics of SU "St. Kl. Ohridski". In 2022 he defended his dissertation on the topic "Surface Photovoltaic Spectroscopy of Semiconductor Optoelectronic Materials and Nanostructures" and was awarded a Doctor of Science degree.

In 1991 he was appointed as a physicist at the Faculty of Physics at SU “ St. Kliment Ohridski”. In the following years, he occupied different academic positions and in 2004 he was appointed as an associate professor at the Department of Condensed Matter Physics and Microelectronics of the Faculty of Physics at SU “St. Kliment Ohridski”. In 2013 he was elected as the head of the same department.

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

The scientific activities presented by Assoc. Prof. Veselin Todorov Donchev fully correspond to the minimum national requirements for Professional Direction 4.1. Physical Sciences and exceed them by the most criteria:

#### **According to criterion A (min. 50 points) – 50 points**

He obtained a PhD from the National Academy of Sciences with Diploma 21345/September 3, 1991.

#### **According to criterion B (min. 100 points) – 110 points**

5 publications equivalent to a habilitation work, which are referenced and indexed in world-renowned databases of scientific information are presented;

#### **According to criterion G (min. 200 points) – 235 points**

11 publications that are referenced and indexed in world-renowned scientific information databases are presented;

#### **According to criterion D (min. 100 points) – 224 points for a professor**

All citations are in scientific journals, referenced and indexed in world-renowned databases with scientific information according to indicator D-11;

#### **According to criterion E (min. 150 points) – 282 points**

E-12 (Obtained scientific degree "Doctor of Sciences") – 75;

E-13 (Scientific guidance of a successfully defended doctoral student) – 50;

E-14 (Participation in a national scientific or educational project) – 20 points;

E-16 (Management of a national scientific or educational project) - 20 points;

E-17 (Management of a Bulgarian team in an international scientific or educational project) – 100;

E-18 (Funds raised for projects managed by the applicant) – 8 points;

E-20 (Published university textbook) – 9.

Scientific activities also meet the additional requirements of SU "St. Kliment Ohridski" for occupying the academic position of "professor" in PN 4.1. Physical sciences and even go beyond them. I will note here that the candidate's h-factor is 9 with a requirement of 8.

The scientific works presented by the candidate do not repeat those from previous procedures for acquiring a scientific title and academic position.

There is no evidence of plagiarism in the scientific works submitted for the competition.

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

As a university lecturer, he delivers lectures in five different disciplines. He is the head of the students' laboratory of electricity and magnetism. He was a scientific supervisor to six and a consultant to four graduate students, as well as a consultant to 2 doctoral students. He was a supervisor of one successfully graduated doctoral student and currently supervises one. He had eight scientific visits to physics laboratories abroad.

#### **5. Content analysis of the applicant's scientific and applied scientific achievements contained in the materials for participation in the competition**

The scientific interests of Assoc. Prof. DSc Veselin Todorov Donchev are in the field of electronic and optical properties of semiconductor materials and (nano)structures for applications in optoelectronics and information and communication technology. He participates in the competition with 22 publications and 113 citations. He is the first or second author in 14 of the presented scientific publications, which determines the significance of the contribution of Assoc. Prof. DSc Veselin Donchev. The candidate's h-factor is 9.

The most significant achievements in which he has made a leading or significant contribution are:

- The contribution of the deep EL2 level to the photoconductivity spectrum of semi-insulating Cr-doped GaAs has been investigated for the first time;
- The improved dark current model in GaAs/AlGaAs multiple quantum wells (based on emission and capture of electrons from the quantum wells) taking into account the reduction of the emission barrier caused by the Poole-Frenkel effect;
- A new approach that takes into account the roughness of the interfaces to calculate the optical reflection and transmission spectra of a multilayer structure is established;
- An experimental setup and methodology for surface photovoltage (SPV) spectroscopy in a wide spectral and temperature range has been developed;
- New SPV studies on some semiconductor nanostructures and bulk layers and structures for optoelectronic applications have been undertaken;
- SPV spectra and SPV transients measured in new perovskite/silicon heterostructures are analyzed.

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

I do not have critical notes on the dissertation and the author's abstract. I recommend the candidate to continue his work in the same direction with an applied nature, using the accumulated knowledge and skills to create a utility model or patent for new discrete components or integrated circuits.

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

I know Assoc. Prof. DSc Veselin Todorov Donchev from our participation in different conferences on physics. He was a lecturer in the master's program "Condensed Matter Physics" at Plovdiv University. My impression is that Assoc. Prof. Veselin Donchev is a well-established physicist with diverse interests and competencies in the field of condensed matter physics. He has the necessary potential to formulate and solve scientific problems concerning any field of physics, with a focus on the electronic and optical properties of semiconductor materials and structures. I congratulate him for his persistence and perseverance in his professional growth as a professor.

## **8. Conclusion about the application**

After considering the materials and scientific works presented in the competition and based on the analysis of their significance and the scientific and applied scientific contributions contained in them, **I confirm** that the scientific achievements meet the requirements of the Act on Development of the Academic Staff in the Republic of Bulgaria, the Rules for its implementation, and the respective Regulations of SU "St. Kliment Ohridski" for the occupation of the academic position of "professor" in professional direction 4.1 Physical Sciences by Assoc. Prof. Veselin Todorov Donchev. In particular, Assoc. Prof. Veselin Todorov Donchev meets 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** assessment to the application.

## **II. GENERAL CONCLUSION**

Based on the above, **I recommend** the scientific jury to propose to the competent authority for the selection of the Faculty of Physics at SU "St. Kliment Ohridski" to elect Assoc. Prof. DSc Veselin Todorov Donchev to occupy the academic position of "Professor" in professional direction 4.1 Physical Sciences.

July 6, 2023

Prepared by: .....

(Prof. Temenuzhka Yovcheva, PhD)