

OPPINION

on a procedure for the occupation of the academic position "Associated Professor", in the professional field 4.1. "Physical Sciences", ("Electrical, magnetic and optical properties of condensed matter"), according to the announcement of Faculty of Physics, Sofia University "St. Kliment Ohridski" in the Newspaper of State, issue 87/19.10.2021,

Candidate: Assist. Prof. Dr. Neno Dimitrov Todorov from Faculty of Physics, Sofia University "St. Kliment Ohridski"

Reviewer: Prof. DSc. Albena Paskaleva, Inst. Solid State Physics, Bulgarian Academy of Sciences

I. General description of the submitted materials

1. Details of the application

The candidate has submitted all the necessary documents for participation in the competition, which meet all the requirements and the regulations on the terms and conditions for obtaining scientific degrees and holding academic positions at Sofia University "St. Kliment Ohridski".

The candidate Dr. Neno Dimitrov Todorov participates in the competition with 18 articles, incl. 15 publications in international scientific journals and 3 works published in the methodological journal "Physics" (non-indexed). The candidate has attached copies of these works. A list of independent citations is presented. Certificates are presented, which certify his participation as a leader of the national physics team in the International Physics Olympiad (IPhO) (4 times); European Olympiad in Physics (5 times) and Romanian Master of Physics (3 times). There are appointments as a member of the National Commission for Organizing and Conducting Various Physics Competitions (National Physics Olympiad; Spring National Physics Competition; Autumn National Physics Competition. His participation in research projects is certified by two documents. The candidate has presented also a report on his teaching load at the Faculty of Physics, Sofia University.

2. Details of the candidate

Neno Todorov obtained a master degree from Sofia University "St. Kliment Ohridski (Sofia University), Faculty of Physics, specialty "Microelectronics and Information Technology" in 2009. In 2014 he defended his PhD thesis: "Phonons in oxides with complex crystal structure". From 2008 to 2013 he worked as a physicist at the Faculty of Physics, Sofia University "St. Kliment Ohridski". In the period 2013 - 2015 he was an assistant, and from 2015 until now – assistant professor at the Faculty of Physics, Sofia University "St. Kliment Ohridski". In the period 2012-2014 he specialized at the Jean Rouxel Institute of Materials, Nantes, France, where he conducted research related to his doctoral dissertation. He was a postdoctoral fellow at the Free University of Berlin (six months, 2019). He has participated in 12 research projects, 3 of which are international, including a project under the FET OPEN program of the European Commission.

His active work with young talents as a leader of the national team in many physics competitions is impressive.

3. General characteristics of the scientific work and achievements of the candidate

Dr. N. Todorov's research and contributions are entirely in the field of condensed matter physics and in particular the study of materials and obtaining information about their structural, electronic and vibrational properties through extensive use of the various possibilities of Raman spectroscopy. The scientific research of Dr. N. Todorov is presented in a total of 24 scientific papers, 18 of which he has used to participate in this competition. 12 of the articles fall into journals in quartiles Q1 and Q2, 2 - in journals in quartiles Q3 and Q4, one - in the referenced and indexed journal without impact factor. Three papers are in Bulgarian and have been published in the methodical journal "Physics", which is not indexed. These papers are divided into groups of indicators as follows: group of indicators B (habilitation thesis) - 4 scientific publications, all in quartile Q1, of which the candidate collects 100 points. By group of indicators D – 14 publications, of which 8 publications in scientific journals in quartiles Q1 or Q2; 2 - in Q4, one - in refereed and indexed journal without impact factor, of which the candidate collects a total of 219 points. The candidate has a significant contribution in five publications. These articles were not used in the procedure for acquiring the PhD degree, as well as in the competition for the position of "Assistant Professor". The independent citations of the articles for participation in the competition are 181, and the total number of citations of all works of the candidate is over 270.

From this review it can be concluded that:

- a) the scientific works meet the minimum national requirements and respectively the additional requirements of Sofia University “St. Kliment Ohridski ” for holding the academic position “Associate Professor” in the professional field PN 4.1. Physical sciences;
- b) the scientific papers submitted by the candidate do not repeat those of previous procedures for acquiring a PhD degree and academic position;
- c) there is no plagiarism proven in the statutory order in the scientific papers submitted at the competition.

4. Characteristics and evaluation of the teaching activity of the candidate

The candidate has a significant teaching activity, covering a very wide range of courses - mechanics, electricity and magnetism, optics, probabilities and statistics, etc. He tutors both in seminars and lectures in compulsory and elective subjects. His working load significantly exceeds the normatively determined employment. Dr. N. Todorov was the diploma supervisor of two successfully defended graduates. His long-term work with high school students should also be noted. He is a member of the national commission for organizing and conducting various physics competitions. N. Todorov is the leader of the national physics team for participation in international Olympiads and competitions.

5. Content analysis of the scientific and scientific-applied achievements of the candidate contained in the materials for participation in the competition

The scientific contributions in the works of Dr. N. Todorov are mainly in the field of application of Raman spectroscopy. The candidate demonstrates in-depth knowledge of the possibilities of this method for non-destructive characterization of materials and skillfully applies them. The spectra were measured under different conditions (polarization, wavelength) in order to obtain the most complete information about the Raman active modes. A large number of materials in the form of single crystals (Sc_2O_3 , Sc_3CrO_6 , CuB_2O_4), powders (R_2O_3 , where R is a rare earth element) or thin layers (NiCo_2O_4 , LiFe_5O_3) were studied, for which little or no information is available in the literature. The frequencies, symmetry and relative intensity of the Raman active modes were theoretically determined by calculations of the crystal lattice dynamics of the monocrystalline samples and the results were compared with the obtained experimental data. I would like to note the systematic study of a series of oxides of different lanthanides and the observed dependence of the frequencies of the most intense Raman lines on the lattice parameter of the unit cell. The applicability of Raman spectroscopy to identify mineral pigments for the purpose of restoration and dating of paintings is also demonstrated. Scientific contributions of the presented works can be classified as the acquisition of new knowledge and proof of new facts, as well as the enrichment of existing theories and knowledge. Evidence of their importance is that they have been published in many outstanding scientific journals, 13 of which are in quartile Q1 journals, of which - Phys. Rev. B - 6; J. Appl. Phys. - 3, Nanomaterials - 1, etc. These works have been cited many times - the citations of all works of the candidate are over 270. Six of the articles have over 20 citations, two of them are highly cited and have over 80 and over 60 citations, respectively. The Hirsch index is 7.

I do not know the candidate personally and I have no critical remarks on the submitted documents and his scientific achievements.

6. Conclusion on the application

After getting acquainted with the materials and scientific works presented in the competition and based on the analysis of their importance and the scientific contributions, I confirm that the scientific achievements of Dr. N. Todorov meet the legal rules and criteria (LDASRB and its regulations in the Sofia University) as well as the specific rules in Faculty of Physics for holding the academic position “Associate Professor” in the professional field 4.1. “Physical sciences”. No plagiarism was found in the scientific papers submitted for the competition. I give my positive assessment of the application.

II. OVERALL CONCLUSION

Based on all said above, I recommend the scientific jury to propose to the Faculty Council of the Faculty of Physics at Sofia University "St. Kliment Ohridski" to award the academic position of “Associate Professor” in the professional field 4.1. “Physical sciences” to Dr. Neno Dimitrov Todorov

24.02.2022

Sofia

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Prof. DSc. Albena Paskaleva