

OPINION

on the competition for holding the academic position "Associate Professor" at IOMT-BAS, in professional field "4.1. Physical sciences", scientific field "Physics of wave processes", published in the Bulgarian State Gazette, issue 79 of October 4, 2022

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member of the scientific jury, appointed by orders №RD-15718 of December 1, 2022,
and №RD-15729 of December 7, 2022 of the Director of IOMT-BAS*

The only participant in the competition, announced in IOMT-BAS for the occupation of the academic position "Associate Professor" in the professional field "4.1. Physical Sciences" ("Physics of wave processes"), is Assist. Prof. Dr. Nataliya Dimitrova Berberova-Buhova.

1. General description of the presented materials

The materials, prepared by the candidate and described in the competition application form, are in accordance with the *Development of Academic Staff in the Republic of Bulgaria Act (DASRBA)* and the *Regulations on the conditions and order for acquiring scientific degrees and for holding academic positions in IOMT-BAS*, and include all required documents. Assist. Prof. Dr. Nataliya Berberova-Buhova is registered in the *Register of the academic staff in the Republic of Bulgaria*, maintained by the National Centre for Information and Documentation (<https://ras.nacid.bg/dissertation-preview/45160>). Data on her academic degree (PhD; PhD thesis titled "Coherent optical metrology: methods and implementation with spatial light modulator") and academic position (Assist. Prof. at IOMT since 2017) are available.

Assist. Prof. Dr. Nataliya Berberova-Buhova is a co-author of 56 publications in scientific journals, 41 of which are published in indexed journals with an impact factor/impact rank. In the current competition, she participates with a total of 27 scientific works, which are not part of the PhD dissertation. The presented scientific papers are co-authored and published in WoS/Scopus indexed journals. 6 publications are in journals of category Q2, 2 publications - Q3, 3 publications - Q4, and 16 publications in journals with impact rank (SJR). The total number of citations is 102 (75 according to Scopus) as of the date of preparation of the reference by the candidate. The Hirsch index of Assist. Prof. Dr. Nataliya Berberova-Buhova according to data from Scopus is 5. The results of the scientific research conducted with the participation of Assist. Prof. Dr. Nataliya Berberova-Buhova are widely popularized - they have been presented at 56 national and international scientific forums. The candidate has extensive experience as a project member (17) and project coordinator (5).

The total number of points according to Table 2, Appendix 1, is 458 and exceeds the minimum required points (430) for the academic position "Assoc. Prof." By groups of indicators, the requirements are also met.

2. General characteristics of the candidate's research activity

The review of the presented materials shows that the scientific interests of Assist. Prof. Dr. Nataliya Berberova-Buhova are aimed at researching the optical properties of photoanisotropic materials (azopolymers) with the addition of nanoparticles and using polarization holography methods for recording diffraction gratings. The original scientific contributions in the scientific publications for participation in the competition are presented in the reference prepared by the candidate. The scientific publications included in group “C” indicators (equivalent to habilitation thesis publications) are 7 in number. The candidate's main scientific contributions, described in the reference for the original scientific contributions in the scientific publications under this group of indicators, are related to improving the optical properties of photoanisotropic materials (azopolymers) for polarization holographic recording by adding nanoparticles. The nanoparticles used in the research are Au, ZnO, TiO₂, bioactive complexes based on copper and nickel ions and goethite (α -FeOOH) nanorods. The influence of various factors such as nanoparticle size, concentration of nanoparticles in the azopolymer layer on the optical response of the material, type of solvent used in deposition of the layers, optimal wavelength for recording, height of the formed relief, etc. was investigated.

20 publications are included in the author's reference for scientific contributions in the publications under indicator “D”, and they are divided into 3 main groups:

- Reversible polarization holographic recording and analysis of the parameters of the obtained diffraction gratings;
- Dynamic speckle analysis and its application for non-destructive control in fast-changing processes (drying of polymer thin layers, etc.); numerical methods for image processing;
- Modeling the optical response from surface-relief diffraction gratings by varying their parameters; modeling of optical constants.

The candidate's scientific contributions can be characterized as enriching the topic by using new/improved techniques and obtaining new results. The author reference adequately reflects the scientific contributions of the candidate.

3. Critical remarks and recommendations

I have no critical remarks on the materials submitted for evaluation.

4. Conclusion

Assist. Prof. Dr. Nataliya Berberova-Buhova submitted for participation in the competition sufficient material in terms of volume and quality, exceeding the requirements for occupying the academic position of “Associate Professor” according to *DASRBA*, the Regulations for the implementation of *DASRBA*, as well as the minimum requirements of BAS and, respectively, IOMT to the scientific and teaching activities of the candidates for the academic position “Associate Professor”. The scientific research of Assist. Prof. Dr. Nataliya Berberova-Buhova is in the field of developing and studying the properties of photoanisotropic materials and their application in polarization holography. She has the necessary scientific qualifications and is a specialist in the field.

I confidently give a positive assessment to the candidates and recommend to the members of the Scientific Jury and of the Scientific Council of IOMT-BAS to choose Assist. Prof. Dr. Nataliya Berberova-Buhova for “Associate Professor” in professional field “4.1. Physical sciences”, scientific field “Physics of wave processes”.

Sofia

January 8, 2023

/Assoc. Prof. Silvia Angelova, PhD/