

REVIEW REPORT

On a competition to occupy the academic position PROFESSOR of specialty 4.1. Physical Sciences (Condensed Matter Physics), National Official Gazette number 12/11.02.2020 z. , for the needs of the IOMT-BAS with the sole candidate Assoc. Prof. Dr. Georgi Lalev Dyankov from IOMT-BAS

Member of scientific jury: Acad. Alexander Georgiev Petrov, DSc

1. General characteristics of the materials presented. Monographies, articles and reports, textbooks, certificates and patents, research projects, etc. Assess whether the quantitative indicators of the requirements of the IOMT-BAS to occupy the academic position have been complied with. Specify the knowledge-related indicators (total number of articles, articles with impact factor, citations), reduction of articles, etc.

The total number of scientific publications of the applicant is 46. Its scientometric data by group of indicators are as follows (in brackets are given the minimum requirements according to the IOMT-BAS regulations):

- Group A – 50 (at least 50)
- Group B – 147 (at least 100)
- Group C - 320 (at least 220)
- Group D – 216 (at least 120)
- Group E – 326 (at least 150)

Thus, the requirements are met and Assoc. Prof. Dyankov has been allowed to participate in the competition.

His PhD thesis is defended in FIAN-Moscow (1987). It included 6 published papers.

Presented in the next competition for the academic degree Assoc. Professor are 15 publications (1984 - 1998).

In this competition, according to the requirements of the law, a separate, habilitation work is presented with 8 publications in referenced international publications included, with impact factor (Web of Science and Scopus) in categories Q1 (two publications) Q2 (three publications), Q3(1 audiences)), Q4 (1 publication) and SJR (1 publication). Papers were published in 2014-2018. The habilitation work is dedicated to the research carried out and the results obtained by the author in the field of optical sensors (including biosensors) working on the Surface Plasmon Resonance (SPR). In the current competition for academic position "Professor", Associate Professor Dr. Dyankov has also separately presented other 14 publications from the period 2005-2020. Thus, the total number of his publications for the requested degree becomes 22.

All these articles are accepted for review. Article reduction is not necessary.

2 filled patents and 3 protected utility models have also been involved in this procedure.

The separately 14 publications separately presented in the competition include 11 (eleven) articles in referenced international journals (in Web of Science and Scopus), including 5 publications in category Q1, one in Q2, one in conference proceedings, 7 in impact-ranked magazines. The citations for this procedure are 108, the total number of Dyankov' citations is 135. H index of cited papers is $H = 8$.

Dr. Dyankov has co-authored 7 physics and astronomy textbooks for secondary schools and 8 auxiliary physics and astronomy textbooks that are used in the school network.

The applicant has led 7 scientific projects, funded mainly by Bulgarian funds (NFSS) and research institutes in Taiwan. He has participated in 22 projects funded by local and foreign organizations.

These scientometric indicators demonstrate the applicant's profound scientific abilities and satisfy the IOMT's requirements for the academic position of "Professor".

2. A general characteristic of the scientific, applied and pedagogical activities of the candidate (scientific fields and problems; supervised PhD students and graduates).

The work experience of G. Dyankov takes place in a wide range of scientific, applied and educational institutions, in Bulgaria and abroad: After 5 years of work (June 2004-March 2009) as a Researcher, at the Industrial Technology Research Institute, Taiwan, he joined the ISSP-BAS (1998–2008), where he later occupied the academic position of Associate Professor. During the period 2009 – 2011 he worked at the Institute of Nanomaterials and Technologies, INANOTECH ENSET, Rabat, Morocco. From 2011 to 2015 he worked at Hilendarski University, Plovdiv, Faculty of Physics, Department of Optics and Atomic Physics, where he was an associate professor and vice dean. In 2012 - 2015 he was an Associate Professor, vice head of Department of Electrical Equipment and Telecommunications at Smolyan Technical College. During 2017-2018 he was an R&D manager in the field of biometry at BIODIT Ltd. in Sofia. And since 2016 he is an Associate Professor at IOMT-BAS. From all places of work relevant reports are presented.

The main scientific field of Assoc. Prof. Dyankov in IOMT currently includes experimental studies of biosensors based on the surface plasmonic resonance.

He became an associate professor by working in the field of optical fibers, in two different aspects: nonlinear effects - theoretical studies on the distribution of solitons and experimental studies on fiber optic sensors for temperature, pressure and magnetic field. His PhD degree he received for theoretical and experimental research and development of single-mode optical fibers and determination of their characteristics, with a view to their application as fiber-optic sensors. It is clear that his participation in this competition for professor is based on a new well-defined and forward-looking scientific direction.

The objects of his study belong to the physics of the solid state (glasses, silenite crystals, etc.), to soft (liquid crystals) and living (biological cells and other structures) condensed matter. Biosensors are an interdisciplinary part of science, and their study and description is carried out mainly using models and methods from solid state physics, liquid crystal physics, wave optics and biophysics. Thus, Assoc. Prof. Dr. Dyankov has a clearly delineated direction in which he is the leader.

He supervised a PhD student, Ivan Krastev Ivanov, and a regular PhD student, Katerina Zhivkova Jeliaskova. Both had successfully defended at the Paisii Hilendarski University in 2016 and 2017. He also supervised four diploma works at the Paisii Hilendarski University.. He is currently supervising a PhD student from IOMT..

3. Basic scientific and/or applied contributions assessing the extent to which they are a personal work of the applicant.

Contributions are largely a personal work of the applicant. In many publications, he is the leading author. He has active collaborations with leading specialists from abroad. He is invited to deliver reports to prestigious conferences abroad and has gained high international prestige.

The main contributions are presented in scientific publications equivalent to habilitation work (8 papers **2 A**,) and in those outside of habilitation work (24 papers **B**). They are grouped

in two areas. The scientific contributions belonging to the first thematic area (Sub-area 1) are entirely experimental.

The scientific contributions A in the habilitation work, 6 in number, are summarized as follows: a new experimental method of direct immobilization of protein on optical converters was developed for the first time and a laboratory prototype of biosensor was created. The results outside of this work are summarized in a further 24 contributions, 5 of which were achieved for the first time.

The main scientific and applied contributions represent protected intellectual property through utility models and patent applications. They are reported in subsection C.

In a special statement attached to the competition documents, the candidate has very clearly distinguished his contributions under this procedure with those of his previous procedures for a doctor and associate professor. It is persuasive that Assoc. Prof. Dyankov entered this competition with an impressive number of contributions in a brand new direction (biosensors based upon a plasmon resonance), without overlapping with his previous contributions.

The reviewer supports all these new contributions, and considers that they have the character of:

- Formulation or justification of a new scientific field or problem, new theory or hypothesis:

contribution A1; contribution A2; contributions A3, A4 and A5; contribution A7; contributions B1, B3, B5 and B7; contribution B8;

-Enrichment of existing knowledge and theories:

contribution A6; contributions B2, B4, B6; contributions B9, B12, B3 and B14; contributions B 10;

-Application of the physics achievements in biological and medical practice, realized social effect:

contributions A8, contributions B1, B4, B6; contributions C1 to C5.

4. I have no special remarks and recommendations on the works presented.

5. Personal impressions of the applicant.

I've witnessed the scientific development of Assoc. Prof. Georgi Dyankov since he joined ISSP-BAS in 1987 (during my directorship of ISSP). He impressed me primarily with his in-depth theoretical training, with his expert knowledge of extensive literature in several main disciplines, including the physics of liquid crystals, this new strand in the physics of soft condensed matter. He demonstrated diverse possibilities of researcher, both theorist and experimentalist, and very good abilities for teamwork and team leadership. A number of his works were awarded as the best in the respective institutions, and two were awarded a silver and bronze medal at exhibitions of discoveries in Taiwan.

He has delivered reports to 17 international and 4 national prestigious scientific conferences. He is invited as a reviewer in a number of reputable foreign magazines, as well as in national grant competitions. He has 11 participations in scientific juries under the law of promotion of academic staff in the Republic of Bulgaria.

6. Reasoned and clearly formulated conclusion (which candidate meets the requirements of the Rules of IOMT-BAS for holding the academic position).

The scientometric data of Assoc. Prof. Dyankov meet as a whole and in details the requirements of IOMT for the academic position "Professor"..

The scientific papers presented characterize the candidate in this competition Assoc. Prof. Dr. Georgi Dyankov as a distinguished Bulgarian scientist-physicist who best represents the Bulgarian physical optics and liquid crystal biosensorics to the world.

Given the topicality, importance and international recognition of his scientific contributions, I fully convinced and strongly suggest Assoc. Prof. Dr. Georgi Djankov to be promoted to the academic position of PROFESSOR in the professional field 4.1. Physical sciences, in specialty: Electrical, magnetic and optical properties of condensed matter.

25.07.2020 r.

Signed:



Reviewer: acad. Alexander Georgiev Petrov

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