

STATEMENT

for competition for an academic position **Associate Professor**
Professional field 5.2: **Electrical engineering, electronics and automation**
Specialty: **Electrical Apparatus**
announced in SG 40 /31 may 2022

Applicant: **Tatyana Marinova Dimova**, PhD, Ch. Assistant Professor
Member of the Scientific Jury: **Dilyana Nikolaeva Gospodinova**, PhD, Professor

1. General characteristic of the applicant's scientific and applied research

Assistant Professor Tatyana Marinova Dimova, PhD, is the only participant in the competition. She teaches at the Faculty of Electrical Engineering at the Technical University of Varna's Department of "Electrical Engineering and Electrotechnologies." Her scientific and research activities are completely focused on the competition's field.

Assistant professor Dr. Dimova participated in the competition for associate professor with 25 scientific works. There is also information about citations.

The presented scientific publications are divided into three groups:

1. *Publications, equivalent to monographic work (Group B4)* – 10 in total, in editions that are referenced and indexed in world-famous scientific information databases - Scopus and Web of Science, including reports from international conferences. The candidate is ranked first in all ten issues and has two papers with Impact Rank (SJR) from this group;

2. *Publications other than those equivalent to monographic work* - formed into two subgroups

- in publications that are referenced and indexed in world-famous databases with scientific information (*group I7*) - a total of 10 issues, all reports at international conferences, of which 2 are simultaneously indexed in Scopus and Web of Science. Three of the positions in this group had the candidate ranked #1.

- 4 of the 5 articles (*group G8*) are reports on conferences held in Bulgaria, and 1 is a report on a conference held abroad, in non-refereed journals with scientific review or in edited collective works. The candidate is in first place for three of the posts in this grouping.

It is evident from a citation report (*Group D*) of the candidate's works that the candidate has 20 citations in publications that Scopus cites as well as 20 citations in other publications.

The resources that have been provided make it evident that the minimum national standards for the academic position of "associate professor" have been reached, and in some cases even exceeded.

Group of indicators	Content	Associate professor	Total number of points per ch. Assistant Professor, Ph.D. T. Dimova
A	Indicator 1	50	50
B	Indicator 4	100	225
C	Indicator 7	200	200
	Indicator 8		36,67
D	Indicator 12	50	200
	Indicator 14		40
G	Indicator 29	30	> 2000

2. Evaluation of pedagogical ability and activity of the applicant

Since 2007 as an assistant and since 2016 as a chief assistant, engineer Tatiana Dimova has worked in the Department of "Electrical Engineering and Electrotechnologies" at the Faculty of Electrical Engineering of the Technical University - Varna. She educated full- and part-time students in the primary competition disciplines in lectures and activities (Group G). A reference to the "bachelor's"

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and "master's" degrees that the candidate successfully defended is also included in the competition documents.

3. Main scientific and applied scientific contributions

The development of new mathematical models for the study of the magnetic field in separation devices operating with permanent magnets, as well as the synthesis of 2D and 3D computer models, can be summed up as the main scientific and scientifically applied contributions of the candidate's habilitation-equivalent publications. It is suggested to use a novel method for simulating and examining the permanent magnet separation process. It was also assessed how the operating parameters of magnetic separators were affected by the design parameters and other factors. Multiple magnetic system configurations have been successfully modelled in order to find the best option for achieving the highest level of purification.

The following can be used to sum up the main scientific and applied scientific contributions of the publications that go beyond those that are equivalent to a habilitation thesis:

- The impact of a magnetic system's geometry and the characteristics of the processed product on the technological process of separation was assessed. The magnetic field density and temperature at key locations are measured as part of a methodology for assessing the resource of magnetic separators. Regarding the variables influencing the separation process using permanent magnets, a generalized non-linear regression equation was developed;

- The use of air gaps and ferromagnetic concentrators to improve the model of a separating magnetic system. The FEMM programming environment was used to create the 2D model;

- New information regarding the procedure for producing electrical energy from an oxyhydrogen generator was gathered. The effect of the working parameters, including flow rate, coefficient of efficiency, and work duration, was assessed;

- The use of a minicomputer and "C"-compiled code in a system for monitoring photovoltaic systems is suggested. Based on this, a more accurate theoretical framework with new correction factors was created and applied to forecasting the production of electric energy.

- A theoretical method was developed through which a 2D model implemented in COMSOL Multiphysics was used to analyze the transient process during direct start of an induction motor. Additionally, a method was developed to assess how an asynchronous motor's rotor cage damage affected the harmonic spectrum of the stator current;

- It is proposed to design a new, fully functional device that does not contain a rotating magnetic field.

- It is suggested to use magnetron sputtering to deposit a one-sided coating made of the same steel's nitride, oxide, and 0Cr18Ni9 on busbars to improve their operational characteristics for electric current values up to 100 A. The technique enables short-circuit mode contact resistance and electrodynamic forces to be estimated even at the design stage of an electric device.

The publications accurately represent the candidate's academic and research activities and are sufficient in terms of volume, scientific level, national promotion, and scope.

4. Significance of contributions to science and practice

The relevance of research in the field of permanent magnet separators, by applying an experimental approach, the approaches of 2D and 3D modelling, is supported by proven implementation in real production conditions ("Elika Processing" Ltd.). The research of Ch. Associate Professor Marinova, as well as the realized scientific and applied scientific contributions in her works, are significant for science due to the achieved results in the field of renewable energy sources and the significant number of citations. The materials made available to me for the Ch. assistant professor Dr. Dimova competition completely satisfy the quantitative indicators of the standards for occupying the academic position of "associate professor" at TU-Varna.

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All quantitative indicators of the requirements for occupying the academic position of "associate professor" at TU-Varna are fully met by the materials supplied to me for the competition of Ch. assistant professor Dr. Dimova.

5. Critical remarks and recommendations

I have no significant criticisms of the candidate's work, and I advise her to keep working and disseminate the word about the results she has achieved by publishing in prestigious journals, attending conferences outside Bulgaria, and being a leader on and taking part in national and international scientific projects.

CONCLUSION

On the basis of the acquaintance with the presented scientific works, their significance, the scientific and applied contributions contained therein, as well as the fact that applicant meets the minimum requirements according to the Regulations for the terms and order of occupying academic positions in TU-Varna, I find it reasonable to propose

Assist. Prof. Tatyana Marinova Dimova, Ph.D.

to occupy the academic position "Associate Professor" in professional field 5.2. "Electrical engineering, electronics and automation" in specialty "Electrical Apparatus" for the needs of TU-Varna.

Date: 02 November 2022

Scientific Jury Member:

/ Prof. D. Gospodinova, PhD/

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