

OPINION

by Maria Georgieva Marudova-Zsivanovits, PhD
Professor at Plovdiv University Paisii Hilendarski

of the materials submitted for participation in the competition
for the occupation of an academic position of "**Associate professor**"
at Plovdiv University "Paisii Hilendarski"

by: field of higher education 4. Natural sciences, mathematics and informatics,
professional field 4.1. Physical Sciences (Physics of Wave Processes)

In the competition for "**Associate professor**", announced in the State Gazette, no. 96 from 17.11.2023 and on the Internet page of Plovdiv University "Paisii Hilendarski" for the needs of the Department of Physics at the Faculty of Physics and Technology, as the only candidate participated **Aneliya Mincheva Dakova-Mollova**, PhD, chief assistant professor at the same department.

1. General presentation of the procedure and the candidate

By order No. RD-21-386/16.02.2024 of the Rector of the Plovdiv University "Paisii Hilendarski" (PU), I have been appointed as a member of the scientific jury to ensure a procedure for selecting an "Associate Professor" at the PU in the field of higher education 4. Natural sciences, mathematics and informatics, professional direction 4.1. Physical sciences (Physics of wave processes), announced for the needs of the Department of Physics at the Faculty of Physics and Technology.

For participation in the announced competition, the only candidate who submitted documents is Chief assistant professor Dr. Aneliya Mincheva Dakova-Mollova from the Department of Physics at the Faculty of Physics and Technology at Plovdiv University Paisii Hilendarski. The set of materials submitted by her in electronic format complies with the Regulations for the Development of the Academic Staff at Plovdiv University Paisii Hilendarski and includes all necessary documents.

The candidate Chief assistant professor Dr. Aneliya Dakova-Mollova has submitted a total of 36 scientific works, including 1 dissertation for the award of an educational and scientific degree of "Doctor," 35 scientific publications (32 articles in peer-reviewed and indexed journals, 3 articles in non-peer-reviewed scientific journals), and a list of her participation in 5 research projects (2 international, 1 national, and 2 university projects).

For review, 25 scientific publications are accepted (all peer-reviewed and indexed in Scopus/Web of Science databases), which are beyond the dissertation and are taken into account in the final assessment, along with participation in 5 research projects. By both quantitative and qualitative criteria, the scientific output of Chief assistant professor Dakova-Mollova exceeds the minimum national requirements for the position of "Associate Professor" – the total score is 597, while only 400 are required.

The documents submitted for consideration are in good technical condition and well-organized. All attached scientific works are of a high standard and undoubtedly have scientific significance.

I have known the candidate since her student years and later as an assistant and chief assistant professor at the Department of Physics. She is very responsible, fair, and respected by both colleagues and students.

2. General description of the candidate's activity.

Evaluation of educational and pedagogical activities.

Dr. Dakova-Mollova has been an Assistant professor on a permanent contract in the Department of Experimental Physics at Plovdiv University Paisii Hilendarski since 2011, and since 2017, she has been a Chief assistant professor at the same department. Her annual teaching load over the past six years has ranged from 528 to 815 hours, exceeding the set norm of 360 hours of academic employment.

The educational and pedagogical activity of Chief assistant professor Dakova-Mollova includes conducting lectures, seminars, and laboratory exercises with students from Bachelor's and Master's degree programs – both in full-time and part-time form of education. Over the past 6 years, she has developed 12 curriculums and 12 lecture courses for Bachelor's and Master's specialties. Materials for six of them have been proposed as an electronic resources in the electronic system of the Faculty of Physics and Technology DIPSEIL. She participates in a joint Master's program in English language called "Medical Physics" between the Faculty of Physics and Technology at Plovdiv University Paisii Hilendarski and the Faculty of Physics at Sofia University "St. Kliment Ohridski", where she teaches the discipline "Laser Technologies in Medicine".

Impressive is the large number of specialized lectures conducted by the candidate – Optical Communication Systems, Fiber Optics and Optical Communications, Waveguide and Nonlinear Optics, Photon Technologies for Data Recording and Processing, Optical Methods for Information Processing, Femtosecond Optics, Optical Methods in Medicine. All of these disciplines are directly related to the theme of the current competition.

Indicator for the professional qualification of Chief assistant professor Dakova-Mollova as a teacher is her active work with students, as for the period 2017-2023 she was the supervisor of 18 graduates, 15 of which successfully defended their Bachelor's degrees and 3 were students from master's programs.

Evaluation of the candidate's scientific activity

In the competition for "Associated professor", Chief Assistant Professor Aneliya Dakova-Mollova participats with a total output of 25 scientific publications, grouped as follows:

- Publications in scientific journals equivalent to habilitation thesis (criterion B4) – 7 issues, 6 of which are in journals with an impact factor (5 articles in *Optik* with IF = 3.1 with quartile Q2 and 2 articles in *Optical and Quantum Electronics* with IF = 3.0 with quartile Q2) and 1 is in a journal with an impact rank (Journal of Physics: Conference Series with SJR = 0.183).

- Publications that are indexed in world-renowned databases (criterion G7) – 18 issues, 9 of which are in journals with an impact factor (2 articles in *Proceedings of the Bulgarian Academy of Sciences* with IF = 0.3 with quartile Q3; 1 article in *Optical and Quantum Electronics* with IF = 3.0 with quartile Q2 ; 1 article in *Nonlinear Dynamics* with IF = 5.741 with quartile Q1; 2 articles in *Results in Physics* with IF = 4.565 with quartile Q2; 1 article in *Optik* with IF = 3.1 with quartile Q2; 2 articles in *Journal of Optoelectronic and Advanced materials* with IF = 0.587 and with quartile Q3 and 9 in journals with impact rank (SJR) (4 articles in *Journal of Physics: Conference Series* with SJR 0.183; 3 papers in *AIP Conference Proceedings* with SJR = 0.164; 1 paper in *Semiconductor Physics, Quantum Electronics and Optoelectronics* with SJR = 0.16; 1 paper in *Proceedings of SPIE – The International Society of Optical Engineering* with SJR = 0.215).

All publications presented for the competition are in English and are in refereed and indexed journals. The results presented in the publications are a collective development, and in 8 of the publications Chief Assistant Professor Dakova-Mollova is the first author, in 8 she is the second author, in 5 she is the third author, in 3 she is the fourth author and in 1 she is the fifth author. These data unequivocally confirm the leading role of Dr. Dakova-Mollova in the peer-reviewed scientific production.

The candidate works purposefully, accumulated significant results, which she made available to a wide audience and received recognition from a number of scientists abroad. The total number of citations presented is 80, all of which are in refereed journals (Scopus/Web of Science). Chief Assistant Professor Dakova-Mollova has an h-index of 9.

Ch. assistant professor, Dr. Aneliya Dakova-Mollova, has fulfilled the national minimum requirements and the requirements of the Regulations for the development of the academic staff of Plovdiv University "Paisii Hilendarski", and by indicators C, G and D she has significantly exceeded them. The points made for each indicator are detailed and supported by evidence.

Main contributions:

The scientific publications and developments of Chief Assistant Professor Aneliya Dakova-Mollova, Ph.D., are in the field of Physics of wave processes, and some of their theoretical aspects are examined - soliton regime of propagation of optical pulses in nonlinear dispersive media, four-photon parametric processes and propagation of optical vortex structures in isotropic nonlinear dispersive media.

The generation of broad-band bright and dark optical solitons in isotropic nonlinear dispersive media has been analytically investigated and exact analytical solutions of the nonlinear amplitude equation in the form of periodic cnoidal waves have been determined. The evolution of broad-band and ultra-short broad-band laser pulses propagating in optical fibers is investigated and new analytical solutions of the nonlinear amplitude equation in the form of dark and bright solitons are found.

The energy exchange between broad-band laser pulses and their components in nonlinear dispersive media was analytically studied, and a new class of analytical solutions was obtained describing the energy exchange between the components of the electric field while taking into account the influence of the effects of self-phase modulation and cross-phase modulation.

The conditions for the generation and propagation of optical vortex structures in isotropic nonlinear dispersive media have been analytically studied.

3. Critical remarks and recommendations

I have no critical remarks about the materials submitted for review. My recommendation to Chief assistant professor Aneliya Mincheva Dakova-Mollova, PhD, is to continue her scientific-research work in the field of theoretical optics.

CONCLUSION

The documents and materials presented by Chief assistant professor Aneliya Mincheva Dakova-Mollova, PhD, meet all the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria, the Regulations for the Implementation of the Law and the relevant Regulations of Plovdiv University "Paisii Hilendarski".

The candidate in the competition has submitted a significant number of scientific works published after the materials used in the defence of her PhD and for occupying the academic position "Chief assistant" at the faculty of Physics and technology at Plovdiv University "Paisii Hilendarski". There are original scientific contributions in the candidate's works that have received international recognition and a representative part of them have been published in journals and scientific collections issued by international academic publishing houses. The scientific and teaching qualifications of Chief Assistant Professor Aneliya Mincheva Dakova-Mollova PhD is unquestionable.

The achievements of Chief assistant professor Aneliya Mincheva Dakova-Mollova, PhD, resulted in educational and research activities fully correspond to the minimum national and additional requirements adopted in connection with the Regulations of the Plovdiv University for the application of the Law on the Development of the Academic Staff in the Republic of Bulgaria.

After familiarizing myself with the materials and scientific works presented in the competition, analysing their significance and the scientific contributions contained in them, I find it reasonable to give my positive assessment and to recommend to the Scientific Jury to prepare a document-proposal to the Faculty Council of Faculty of Physics and Technology for the selection of chief assistant professor Aneliya Mincheva Dakova-Mollova, PhD, in the academic position of "Associate professor" at Plovdiv University "Paisii Hilendarski" in: area of higher education 4. Natural sciences, mathematics and informatics, professional field 4.1. Physical Sciences (Physics of Wave Processes).

03.04.2024

Prepared the opinion:

Professor Maria Marudova-Zsivanovits, PhD