REVIEW

from Corresponding Member Peter Yordanov Velinov (IKIT at BAS),

appointed a member of the Scientific Jury, by order № 15 / 24.01.2020 of the Director of IKIT – BAS, in a competition for the academic position of "professor" in the field of higher education 4. Natural Sciences, Mathematics and Informatics, professional field 4.4. Earth Sciences (Studies of the processes in the middle and upper atmosphere of the earth) for the needs of the section "Atmospheric optical research", IKIT – branch Stara Zagora, announced in the "State Gazette" issue. 98 of 13.12.2019

with the only candidate Assoc. Prof. Dr. Veneta Hristova Gineva,
from the Atmospheric Optical Research Section,
to the Branch of IKIT-BAS in Stara Zagora.

A review of the documents submitted showed that they complied with all procedures resulting from ZRASRB (Art. 60, para. 1 and 2), Regulations on Application and the Regulations on the conditions and procedure for acquiring scientific degrees and academic positions at BAS and IKIT at BAS.

General information about the candidate

Assoc. Prof. Dr. Veneta Hristova Gineva in 2001 successfully defended a dissertation on "CO + in the spectrum of Halley's comet, according to data from the three-channel spectrometer of VEGA-2", and was awarded the educational and scientific degree "Doctor" in specialty of the Higher Attestation Commission 01.04.08 "Physics of the ocean, atmosphere and near-Earth space", with a decision of the Higher Attestation Commission / Protocol № 7 / 03.04.2001 / Commission 06 on Physics and Astronomy.

She has successively worked as: physicist-specialist in CLKI, researcher II degree, researcher I degree in section "AOI", and since 2008 as "Associate Professor" at ISZV and IKIT at BAS.

Dr. Gineva has collaborated with scientists from leading European research centers in the EU and Russia. She had the opportunity to improve her work with modern experimental techniques, to develop mathematical models and process experimental data in the study of outer space, to conduct and lead research in the field of solar and space physics.

Characteristics of scientific works

On the topic of the competition for professor, the candidate has presented a total of 76 publications, of which 13 papers are in international scientific journals with IF.

The overall scientific activity of the candidate includes 123 publications and 1 copyright certificate, of which 33 have been published in international scientific journals with IF, such as: JASTP, Adv. Space Res., Chem. Physics Lett., Ann. Geophys., Planetary and Space Science, Geomagnetism and Aeronomy, C. R. Acad. Bulg. Sci. and others.

It is published in the list of cited documents for the work of the candidates in scientific journals, referenced and indexed in the world databases, as well as in monographs and in non-referenced lists, which are a total of 75 citations, which are presented and evaluated for their results and learn offered to Dr. Gineva.

More important scientific and scientific - applied contributions in the field of solar and space physics

1. Prediction of sunspot numbers (SSN) for the next solar cycle № 25 using autoregressive models for both hemispheres of the Sun. The fact that the dynamic processes in both solar hemispheres are not strongly connected is used. Therefore, the evolution of the solar cycle is described by autoregressive (AR) models, developed for the first time separately for the Northern and Southern Hemispheres, and the total SSNs are calculated by summation. Semi-annual data were used.

It was found that the maximum SSN in the Northern Hemisphere must be reached before the maximum in the Southern Hemisphere. Solar activity in the Southern Hemisphere will be dominant. The maximum number of total SSN 117 (with a confidence interval from 77 to 165) is projected to be reached in 2023.

This is the last, most recent contribution of the candidate (since 2020), which is very important for solar physics, space climate and space weather in the solar system (R1.13).

2. Another important contribution that I would like to emphasize is related to the design, fabrication and measurement of the Lyman-alpha solar hydrogen line. Under the international project for rocket experiments HOTPAY1 from the 6th Framework Program of the EU, a modern device for rocket experiments - Lyman-alpha detector (ASLAF - Attenuation of Solar Layman Alpha Flux) was developed, calibrated and tested, based on an ionization chamber and modern electronics, to register the attenuation of direct Lyman-alpha radiation in the atmosphere. The operating characteristics of the device (R1.2, R1.11, N33, N51) were studied.

3. To study the processes in the summer mesosphere and thermosphere at high latitudes, rocket measurements of direct Lyman alpha radiation penetrating the atmosphere have been planned and conducted. A methodology has been developed and programs have been created for calculating the profiles of O2 concentration, pressure and temperature according to the vertical profile of Lyman alpha obtained from the measurements (R1.2, R1.11).

4. Among the number of contributions of the candidate in the study of the influence of solar activity and solar wind on the magnetosphere, ionosphere and magnetic disturbances, I am particularly impressed by the analysis of medium-latitude substorms as an effect of strong magnetic storms. The strongest magnetic storms during the 24th solar cycle (SYM / H <-100nT) are considered. The development of the magnetic sub-storms during the different phases of the powerful geomagnetic storms is traced, such as on: 17.03.2013 (3 sub-storms), 17.03.2015 (3

sub-storms), 22.06.2015 (1 sub-storm), 07.09.2017 (07.09– 2 sub-storms, 08.09– 3 sub-storms) and 25.08.2018 (7 sub-storms) (R2.3, N41).

5. Methods for determining the stratospheric ozone content have been developed (N10, R2.7). New methods for determining the Ultra-Violet Index (UVI) (N13) have been developed. The results of ozone and UVI measurements were validated using satellite data, from the METOP-B satellite (EUMETSAT in cooperation with NOAA) and the AURA satellite. The comparison shows a very good correspondence for the time when the satellites fly over the territory of Stara Zagora (N30, N40 , R2.7).

Participation in research projects

In 2005-2011 I was a member of NEK in NFNI and I was a reviewer and then an observer for 3 years of a project of the candidate; Dr. Gineva was the head of the national scientific project: "Study of the processes in the field of mesopause through rocket measurements of direct Lyman-Alpha radiation penetrating the atmosphere", Contract with the Ministry of Education and Science, National Fund "Scientific Research" №NZ 1515/05 (2005-2008). I must emphasize that this project was one of the most successful and ended
withan excellent grade.

She has supervised and successfully completed four international research projects: "Impact": Study of the impact of solar activity and solar wind fluxes on magnetospheric perturbations, particle eruptions and aurora borealis - EBR projects between IKIT - BAS and the Polar Geophysical Institute, , RAS, Apatity, Russia - a total of 8 years (2008-2016).

Critical remarks on the submitted materials in the competition

A number of the publications submitted for the competition reached me even before they were published. As a reviewer, I addressed my remarks to them and the works were corrected in a timely manner. For example, this year
I reviewed very carefully her latest work R1.13:

Werner, R., V. Guineva, Predicting the number of sunspots for the solar cycle 25, using autoregressive models for both hemispheres of the Sun, C. R. Acad. Bulgarian Sci., V.73 (1), pp.82-89, 2020, JCR-IF (Web of Science): 0.321.

Even this title was corrected and improved by me.

And last year I reviewed the work R2.3:
V. Guineva, I. Despirak, N. Kleimenova, Substorms manifestation at high and mid-latitudes during two large magnetic storms, Aerospace Res. Bulg., V.31,
pp.27-39, 2019.

In this way, all inaccuracies in the publications are removed, which is why I have no critical remarks. I can confirm that the publications are in very good condition.

Personal impressions of the candidate

I have known the candidate Dr. Gineva since 1983, when she started working at CLKI. She subsequently applied for a research associate competition. At that time, in the 80's, Prof. DSc Mitko Gogoshev (Head of the branch of CLKI - Stara Zagora) organized international conferences and seminars there every year. He even held symposia and colloquia of COSPAR, IRI, etc., which ended with publications in the journal *Advances in Space Research*. I actively attended these events and met with Veneta Gineva, both on scientific issues and on her examination paper, because I was on the commission for her examination as a research associate, where she presented herself with excellent results.

She proved to be a serious and profound young scientist. He participated in international events with reports. He began to be actively involved in the topics, projects and experiments of CLKI and IKI, and subsequently took over the leadership of some of them. Establish fruitful international contacts. Even in the just mentioned work R 2.3 from 2019:

Substorms manifestation at high and mid-latitudes during two large magnetic storms, Aerospace Res. Bulg., V.31, pp.27-39, 2019.

DOI: https://doi.org/10.3897/arb.v31.e03

Dr. Gineva is a co-author with the world-famous in space sciences Prof. Natalia Kleimenova.

General conclusion

Based on these examinations and analyzes, I believe that the materials submitted by the candidate completely burn out, even exceeding the requirements of ZRASRB, the Regulations for its implementation, as well as the adopted Rules of the General Assembly of BAS and IKIT-BAS, to occupy the academic position "professor".

I give a completely positive assessment of the candidate and with deep conviction I propose to the Scientific Jury to propose to the Scientific Council of IKIT - BAS to choose Assoc. Prof. Dr. Veneta Hristova Gineva to take the academic position of "professor" in higher education 4. Natural sciences, mathematics and informatics, professional field 4.4. Earth Sciences (Research of the processes in the middle and upper atmosphere of the earth), for the needs of the section "Atmospheric optical research", Stara Zagora Branch of ICIT - BAS.

Prepared the review:

(Corresponding Member P. Velinov)

ВЯРНО С ОРИГИНАЛА

БЪЛГАРСКА АКАДЕМИЯ НА НАУКИТЕ
ИНСТИТУТ ЗА КОСМИЧЕСКИ ИЗСЛЕДВАНИЯ И ТЕХНОЛОГИИ