

## ATTITUDE OF REVIEWER

By Professor Dr. Evgeni Hristov Semkov, (IA and NAO, BAS)

on the competition for occupation of the academic position "Associate Professor" in the professional field 4.1 Physical Sciences, scientific specialty "Astronomy and celestial mechanics" for the needs of the "Sun and Solar System" Department, on the topic "Chemical composition and properties of the surfaces of small bodies in the Solar system", announced by the Institute of Astronomy and National Astronomical Observatory, BAS, according to an announcement in Newspaper of State no. 47 from 14/06/2019

With one candidate, Dr. Galin Biserov Borisov, Assistant at the Institute of Astronomy and NAO, BAS

Dr. Galin Borisov has completed his higher education for master's degree at Sofia University "St. Kliment Ohridski" in 2002. He defended his dissertation for the PhD degree in 2009 on the topic "Physical properties of dust in comet atmospheres". Since 2002 Galin Borisov has been working at the Institute of Astronomy at Bulgarian Academy of Sciences and has been consistently occupying the positions of physicist and chief assistant. Since 2015, Galin Borisov has been a postdoctoral specialist at Armagh Observatory, Northern Ireland (UK).

The main scientific contributions of Dr. Galin Borisov on the topic of the announced competition are in the following directions:

1. Spectral studies of small bodies in the solar system, interpretation of the reflective spectra in the visible and near infrared regions of asteroids to determine the chemical composition of their surface. The asteroids located at the L4 and L5 Lagrange points of Mars were investigated by spectral observations. For the Eureka asteroid family, the taxonomic class of its largest members has been found to be of the rare A-class whose surface is composed by the olivine mineral. The asteroid 1999 UJ7 is a very slowly rotating primitive object, most likely trapped in Mars orbit as it enters the Solar system from its outskirts.

2. Polarimetric observations of small bodies in the solar system, which are characterized in three ways - intensity, color and polarization. The linear polarization, reflected by sunlight from the surface of the asteroids, shows variations with the phase angle (Sun-object-Earth angle). The intensity of reflected sunlight depends on the geometry of the observation and the shape of the object, in only a few cases a change in the linear polarization with the axial rotation of the object has been observed. It is assumed that this change is due to the heterogeneity of the object surface, the mineralogical, the properties of regolith, or a combination of them.

3. Photometric studies of small bodies from the solar system, determining the colors of weak objects that are inaccessible to spectral observations, in order to determine their taxonomic class.

Dr. Galin Borisov has presented a list of 22 publications on the topic of the competition, 18 of which are in peer-reviewed scientific journals (six in A&A, five in Icarus,

four in MNRAS and one each in Earth, Moon, and Planets, Planetary and Space Science and in the Philosophical Transactions of the Royal Society of London A: Mathematical, Physical and Engineering Sciences, and 4 in Impact Rank journals (IBVS, BlgAJ, Chemistry: Bulgarian Journal of Science Education and in Proceedings of the International Astronomical Union). Dr. Galin Borisov has provided a list of 90 citations of publications with excluded co-authors. The number of publications and citations is sufficient to cover the requirements for registration in the NACID database and the Regulations for the application of the Law on the Development of Academic Staff in Bulgaria for the occupation of the academic position "Associate Professor".

Dr. Galin Borisov's personal contribution to the publications consists in receiving new observations of small bodies from the solar system, processing and analyzing the data and preparing the results for publication. Dr. Galin Borisov is the first author of five of the publications, all of them in the Impact journals, which is also evidence of his undoubted contribution to scientific results.

#### CONCLUSION

My categorical opinion is that the scientific results, publications in reputable astronomical journals, the scientific activity of the candidate Dr. Galin Biserov Borisov in IA and NAO fully comply with the requirements of the Law on the Development of Academic Staff in Bulgaria, its regulations and the criteria of the Institute of Astronomy and NAO for awarding of the academic position "Associate Professor". I recommend the Scientific Council of IA and NAO to elect Dr. Galin Biserov Borisov in the academic position of Associate Professor in the professional field 4.1 Physical Sciences, scientific specialty "Astronomy and Celestial Mechanics".

Sofia

October 21, 2019

~~/prof. Dr. Evgeni Semkov/~~