R E P O R T

on a competition for academic position "Associate Professor"
in professional field 4.5. Mathematics (Mathematical methods in physics),
for the needs of the Institute of Mathematics and Informatics in Bulgarian Academy of Sciences (IMI-BAS), announced in SG, issue 89/ 16.10.2020 and on the Website of IMI_BAS

This report is prepared by Ass.mem. prof. Dr. Sci. Stefan Petrov Ivanov from the IMI-BAS professional field 4.5. Mathematics (Differential Geometry), as a member of the Scientific Jury on this procedure according to Order № 216 / 14.12.2020 of the Director of IMI-BAS.

Only one applicant has submitted documents for participation in the announced competition: Main Assistant Proffesor PhD Veselin Georgiev Filev, IMI-BAS.

I. General description of the presented documents

1. Information about the documentation

The documents presented by the applicant for the competition satisfy the requirements of the Act on Development of the Academic Staff in the Republic of Bulgaria, the Regulations for its application, and the Rules for the conditions and regulations for acquiring scientific degrees and occupying academic positions in IMI-BAS.

For participation in the competition, the applicant Veselin Georgiev Filev has presented a list of 7 scientific papers, all of them being publications in the most prestigious scientific journals with high impact factor. A list of the applicant's citations is also presented, as well as 16 other required documents (official notes, certificates for working experience, references for participation in projects and other relevant evidences), supporting the applicant's achievements.

2. *Information for the applicant.*

The applicant Veselin Filev was born in 5.10.1979 in Bulgaria, graduated with a Bachalor's degree in physics in 2002 and a Master degree in Theoretical and mathematical physics from the Sofia University "St. Kliment Ohridski", Faculty of Physics in 2003. In 2008 he obtained doctor degree in Theoretical and Mathematical Physics from the University of Southern California, Los Angeles, USA. In the period 2008-2010 and 2012-2016 he was a post-doc in the Dublin Institute of Advanced studies, Dublin, Irleland and during the period 2010-2012 he was a post-doc in the Max Plank Institute, Munich, Germany. In 2017 he held a position as an assistant professor and from 2019 he occupied the position of main assistant professor in IMI_BAS, Sofia, Bulgaria where he currently works. From 2020 he also works as an adjunct assistant professor in the American University in Bulgaria.

3. General characteristic of the scientific work and achievements of the applicant.

The research interests of d-r Filev are mainly in the field of supersymmetric string theories, quantum supergravity, AdS/CFT correspondence and its generalizations - the most important and promising physical theories now days with final goal to create a model which may unifies fundamental forces in the Nature. The AdS/CFT correspondence, suggested by Maldacena, relates string theory on the product of anti-deSitter space with a compact Einstein space to a conformal field theories, the so-called p-brain solutions in superstring theory. It happened that the AdS/CFT correspondence is a power-full analytical tool for a non-perturbative dual description of the non-abelian gauge theories in terms of string theory on a suitable space-time and some generalizations of the AdS/CFT correspondence describe the fundamental sources in the superstring theories with a fundamental model the quantum chromodynamics.

It is worth to mention the fact that some of the most famous physicists and mathematicians in the world e.g. the Nobel prize winners G.'t Hooft, S. Weinberg, A. Salam, the Fields medal winners S.-T. Yau, E. Witten etc. were working and work in this field. In my opinion the branches of physics and mathematics where d-r Filev is working are the most important and promising parts of physics and mathematics in the world.

For the participation in the competition, the applicant d-r Filev has presented 7 scientific papers, 6 of them are published in JHEP-Q1, and 1 in PoS CORFU-Scopus.

All the presented scientific publications submitted for the competition have not been used in previous applications for acquiring a scientific degree or occupying an academic position.

No plagiarism has been established in the scientific papers submitted for the competition.

The presented scientific publications for the competition meet the minimal national requirements of the Act on Development of the Academic Staff in the Republic of Bulgaria as well as the additional requirements of the IMI-BAS for occupying the academic position "Associate Professor" in the scientific field and professional field of the competition.

4. Characteristic and evaluation of the teaching activities of the applicant.

The applicant Veselin Filev has a rich teaching activity, only for 2020 he had 250 hours in Bulgaria.

5. Analysis of the scientific and scientific-applied achievements of the applicant contained in the documents and publications presented for the competition.

In my opinion the scientific achievements of d-r Filev in the theory of supersymmetric strings, quantum supergravity, some aspects in AdS/CFT correspondences, by no doubt, are quite remarkable.

It is sufficient to be mentioned that it is constructed a perturbative non-supersymmetric background with non-trivial B-field (magnetic field) which is AdS/CFT dual to a $SU(N_c)$ N=4 super Yang-Mills theory coupled to N_f massive fundamental flavours and the properties of this new solution are investigated, i.e. the geometry of the solution and the physics of the dual theory are investigated. It is started with a supersymmetric background, from the action of the type IIB-supergravity plus the contribution of the N_f D7 branes, then the corresponding equations of motion are written

down and in solving these equations of motion in the vacuum the standard 5-sphere is replaced by the squashed 5-sphere which leads to non-supersymmetric solutions. A numerical solution is also found.

The remarkable scientific quality of the work of the applicant Veselin Filev become clear also from his high numerical parameters: he has presented 7 scientific publications submitted for the competition that have not been used in previous applications for acquiring a scientific degree or occupying an academic position. Six of these papers are published in **JHEP** which is the world top journal in high energy physics and 1 is in **PoS CORFU-SCOPUS.** The sum of all impact factor of these publications is over 36. He presented 12 citations in Q1-Journals from the all 73 citations of these 7 publications and all of his citations are 813 with h-index = 14. Most of his citations are by foreign authors in renowned scientific journals.

6. Conclusion for the applicant

After my careful and critical reading of the documentation and the publications presented for the competition and my analysis of their significance and the scientific and scientific-applied contributions, **I confirm** that the scientific contributions of d-r **Veselin Filev** meet the requirements of the Act on Development of the Academic Staff in the Republic of Bulgaria, the Regulations for its application, and the Rules for the conditions and regulations for acquiring scientific degrees and occupying academic positions in the IMI-BAS for occupying the academic position **"Associate Professor"** in the scientific field and the professional field of the competition. In particular, the applicant meets the minimal national requirements in the professional field and no plagiarism has been established in the scientific papers submitted for the competition.

I give my **positive** evaluation for the application.

II. GENERAL CONCLUSION

Based on the above, **I recommend** the Scientific Jury to propose to the Council responsible for the election of the IMI-BAS to elect **Main Assistant Proffesor PhD Veselin Georgiev Filev** to occupy the academic position **"Associate Professor"** in the professional field 4.5 Mathematica (Mathematical methods in physics).

27.01.2021 г.   Referee: ....

(Prof. Dr.Sci. Stefan Ivanov)