

OPINION

**on a competition for academic credibility
Associate Professor
in the professional field 4.1 Physical Sciences,
for the needs of Sofia University "St. Kliment Ohridski" (Sofia University),
Faculty of Physics (FZF), announced in Government Bulletin no. 57 of 26/06/2020**

The opinion was prepared by: Prof. Radoslav Christov Rashkov, Dr. Habil,
Sofia University Faculty of Science, as a member of the scientific jury of the competition:
4.1. Physical Sciences (Theoretical and mathematical Physics) according to Order No. RD 38-323 /
21.07.2020 of the Rector of Sofia University.

Only one candidate has submitted documents for participation in the announced competition:
Chief Assistant Dr. Kiril Petrov Hristov, Institute for Nuclear Research and Nuclear Energy, BAS.

I. General description of the materials presented

1. Details of the application

- The documents submitted by the applicant according to the competition comply with the requirements of ZRASRB, RAPRRRB and the Regulations on the conditions and procedure for acquiring academic degrees and occupying academic positions at Sofia University "St. Kliment Ohridski" (PURPNSZADU).

- To participate in the competition, candidate Kiril Petrov Hristov presented a list of 22 (out of 33 with authorship) titles of scientific publications in the most prestigious Physics journals (including 9 used for Chief Assistant). Additional 20 documents (in the form of notes and certificates from an employer, project manager, project sponsor or sponsor, references and reviews, awards and other relevant evidence) supporting the applicant's achievements were also presented.

• Additional remarks and comments – All documents meet the requirement for the competition, including ZRASRB and PURPNSZADU.

2. Details of the applicant

Short professional and biographical details of the applicant.

Studying: Kiril Hristov started his University education as a student in Jacobs University, Germany. There he obtained his bachelor degree. The title of his bachelor thesis is „ Black Holes in five Dimensions“ under supervision of Prof. B. Hartman. Kiril's master degree has been obtained from Utrecht University, Nederland. His education has been noted by the excellence "Master of Science cum laude, Theoretical Physics“. The title of Master diploma thesis of Kiril is „ On Moduli Stabilization in Type IIB String Theory“ with supervisor S. Vandoren. Kiril Hristov has published a paper "On Moduli Stabilization in Type IIB String Theory" (the only author) in the the top journal in the area, JHEP 01 (2009) 046.

Doctoral Degree: Doctoral degree of Kiril Hristov has been obtained from Utrecht University. Under the supervision of prof. S. Vandoren, in the period 2008-2012, Kiril has published 5 papers and defended PhD thesis „ On Moduli Stabilization in Type IIB String Theory“.

Postdoctoral experience: From 2012 to 2015 Dr. Kiril Hristov has been postdoc in one of the established group in the area – Theoretical Physics group of Università di Milano-Bicocca, Italy. Since then he has long term fruitful collaboration with Prof. Alberto Zaffaroni.

Awards: In his application Dr. Kiril Hristov presents an impressive list of 11 prestigious awards. I am not going to list all of them, but I should mention the most prestigious Bulgarian ones: „Pythagores“ for the best young researcher in Bulgaria, and the award of Bulgarian Academy of Sciences „Matin Drinov“.

3. General characteristics of the applicant's scientific work and achievements

Dr. Kiril Hristov's scientific subject is in one of the most up-to-date areas of modern theoretical and mathematical physics, namely, important problems of String theory, holographic correspondence, Gravity in space-times with more than the standard four dimensions. As a motivation for this type of exploration is drawn from fundamental questions in modern high energy physics - the Grand Unification theories in the context of Kaluza-Klein compactifications, string theory which is consistently defined in space-times with more than 4 dimensions, as well as our understanding of black holes at classical and quantum level. If we have to classify thematic topics of Dr. Kiril Hristov's research, these are:

i) solutions for and properties of black strings and black holes of different topology in gauge supergravities in (asymptotically) anti- de Sitter type.

ii) thermodynamical characteristics and properties of black holes in holographic theories. These considerations consist of derivation and study of conserved charges, Bekenstein-Hawking entropy for wide classes of supersymmetric black holes

iii) development of sophisticated mathematical methods for computation of microscopic states describing black holes in various holographic models. These methods include in an intricate way Index theory and generalized localization.

Analyzing the materials presented in this competition, I can reasonably and definitely state that:

a) the scientific works far exceed the minimum national requirements (under Art. 2b, para. 2 and 3 of ZRRAB) and accordingly the additional requirements of Sofia University “St. Kliment Ohridski” for the academic position of Assistant Professor in the scientific field and professional direction of the competition;

b) the scientific papers submitted by the applicant do not repeat those of previous procedures for the acquisition of a scientific title and academic position;

c) there is no proven plagiarism in the scientific works presented at the competition.

4. Characterization and evaluation of the applicant's teaching activity

I would summarize K. Hristov's teaching experience as follows:

Преподавателската дейност на К. Христов бих резюмирал по следния начин:

a) he has given **lectures** on Quantum Field theory and Advanced Quantum field theory for Master degree program of Faculty of Physics of Sofia University.

b) Kiril has given seminars on:

- Quantum Field Theory, Advanced Field Theory in Particle Physics, General Relativity, and Statistical Field Theory (Utrecht University, Netherlands)

- General Physics, Advanced Physics A1 (Classical Mechanics and Special Relativity), and Advanced Physics A2 (Quantum Mechanics) (Jacobs University, Bremen, Germany).

Teaching load of Chief Ass. Kiril Hristov since his PhD years until now corresponds to almost 3 years full teaching load for Sofia University.

c) Kiril directed one PhD student during his postdoc in Università di Milano-Bicocca, Italy (Andrea Rota with advisor Prof. A. Tomasiello) .

In view of my many years contacts with the applicant, I commend the quality of teaching and activity as high as possible.

5. Substantive analysis of the scientific and applied scientific achievements of the candidate contained in the materials for participation in the competition

Without going into a detailed description of the scientific contributions of Dr. Kiril Hristov, I would make the following classification of his achievements:

- a large class of anti-de Sitter black hole solutions has been constructed, the solutions have been obtained as gauge supergravity solutions;

- new methods for supergravity localization have been developed, as well as they have been applied to microscopic approach for black hole investigations, including holographic models;

- the dual gauge field theories corresponding to black holes, black branes, strings, rings and other more exotic topologies of the horizon, supported by abelian and non-abelian conserved charges, have been investigated;

Scientific achievements of Dr. Hristov have been well appreciated and are impressive. They are far above national minimal levels required by law: 22 publications in the most prestigious journals (classified as **Q1**) and **h-index=18**. These publications are accompanied with 23 talks at international conferences and workshops.

Dr. Kiril Hristov states for this competition **122** independent citation (out of **721** in total). I expect the citations to rapidly grow with the time.

All these does not exhaust Dr. K. Hristov achievements at all. It is impressive his involvement in collaboration with world-wide known scientists as Alberto Zaffaroni, Alexandro Tomasiello, Yuji Tachikawa and others.

6. Critical notes and recommendations

Essentially, I have no critical remarks about the candidate.

7. Personal impressions of the applicant

I have known the candidate since his PhD student years. I have witnessed the growth of Kiril Hristov as scientist from doctor to postdoc and Chief assistant. Although his participation in national and international scientific projects have not been mentioned, I can confirm his valuable contributions to the scientific groups

Throughout this time, I have witnessed Kiril's dedication to physics and science, with which he has linked his professional realization. I can say that the opinion for his highest level competence and professionalism are well deserved. As a person, I should say that Kiril is excellent colleague you can always rely on.

8. Conclusion on the application

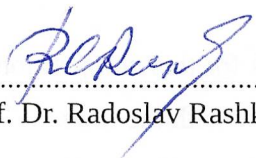
Having become acquainted with the materials and scientific works presented in the competition and on the basis of the analysis of their importance and the scientific and applied contributions contained therein, **I confirm** that the scientific achievements meet the requirements of the ZRASRB, the Regulations for its implementation and the corresponding Regulations of Sofia University "St. Kliment Ohridski" for the position of the candidate in the academic position of Associate Professor in the scientific field and professional direction of the competition. In particular, the applicant not only meets the minimum national requirements in the professional field, but substantially exceeds them. The scientific works submitted for the competition have not been established.

I am convinced of my **positive assessment** of the application.

II. Overall Conclusion

Based on the above, I recommend that the Scientific Jury to propose to the Faculty Council of the Faculty of Physics at Sofia University "St. Kliment Ohridski" to select Assistant Professor **Dr. Kiril Petrov Hristov to be elected** for the academic position of "Associate Professor" in the professional field 4.1 Physical Sciences.

29.09.2020

Signature: 
(Prof. Dr. Radoslav Rashkov)