

## 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. Plamen Lyubenov Bozhilov, Dr. Habil,**

Institute for Nuclear Research and Nuclear Energy, BAS

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**

- 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**

**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 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 should mention the most prestigious Bulgarian ones: „Pythagores“ for the best young researcher in Bulgaria, and the award of Bulgarian Academy of Sciences „Marin 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: String theory, AdS/CFT duality, Supergravity models, field theory in curved space, black holes in classical gravity and string theory.

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).

Even more, they comply with the highest international requirements. It is clear from the fact, where the presented 22 papers are published.

**JHEP – 17, PRD – 3, NPB – 2**

These are international journals with high impact factors.

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

Sofia University, Bulgaria 2016 - present

- Teaching the Quantum Field Theory and Advanced Quantum Field Theory courses in the master's programme in theoretical physics

Università di Milano-Bicocca, Italy 2013 - 2015

- Partial supervision of a PhD student, Andrea Rota, with main supervisor Prof. Alessandro Tomasiello

Utrecht University, Netherlands 2007 - 2012

- Teaching assistant for the master level courses Quantum Field Theory, Advanced Field Theory in Particle Physics, General Relativity, and Statistical Field Theory

Max Planck Institute for Nuclear Physics, Heidelberg, Germany

Group of Quantum Dynamics in Intense Laser Fields Jun - Aug 2005

- Internship as a project student in the field of Above Threshold Ionization (ATI), under the supervision of Dieter Bauer

Jacobs University, Bremen, Germany 2004 - 2006

- Teaching assistant for the bachelor level courses General Physics, Advanced Physics A1 (Classical Mechanics and Special Relativity), and Advanced Physics A2 (Quantum Mechanics)

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

The scientific contributions of the candidate are in the fields of String theory, AdS/CFT duality, Supergravity models, field theory in curved space, black holes in classical gravity and string theory.

The investigations are performed for different spaces with different dimensions and different properties.

**Namely:**

**1. Axion Stabilization in Type IIB Flux Compactifications**

**2. Maximally supersymmetric solutions of  $D=4$   $N=2$  gauged supergravity**

3. BPS black holes in  $N=2$   $D=4$  gauged supergravities
4. Static supersymmetric black holes in  $AdS_4$  with spherical symmetry
5. On BPS bounds in  $D=4$   $N=2$  gauged supergravity
6. On BPS Bounds in  $D=4$   $N=2$  Gauged Supergravity II: General Matter couplings and Black Hole Masses
7. Ungauging black holes and hidden supercharges
8. Supersymmetry on Three-dimensional Lorentzian Curved Spaces and Black Hole Holography
9. Phase transitions of magnetic  $AdS_4$  black holes with scalar hair
10. Rotating black holes in 4d gauged supergravity
11. Attractors, black objects, and holographic RG flows in 5d maximal gauged supergravities
12. Dimensional reduction of BPS attractors in AdS gauged supergravities
13. 6d-5d-4d reduction of BPS attractors in flat gauged supergravities
14. Wilson lines for  $AdS_5$  black strings
15. Higher derivative corrections to BPS black hole attractors in 4d gauged supergravity
16. An extremization principle for the entropy of rotating BPS black holes in  $AdS_5$
17. Holographic microstate counting for  $AdS_4$  black holes in massive IIA supergravity
18. On the quantum entropy function in 4d gauged supergravity
19. A note on the entropy of rotating BPS  $AdS_7 \times S^4$  black holes
20. 6D attractors and black hole microstates
21. The Holographic Dual of the  $\Omega$ -background
22. Matter-coupled supersymmetric Kerr-Newman- $AdS_4$  black holes

Impact factor – high  
(*JHEP* – 17, *PRD* – 3, *NPB* – 2),

**h-index=18**

*The contribution of the candidate is essential in all 22 publications presented.*

## **6. Critical notes and recommendations**

I have no critical remarks and recommendations about the candidate.

## **7. Personal impressions of the applicant**

My impressions are:

1. He is very good in his field of research
2. He is doing the corresponding paper work in our Institute very well.

## **8. Conclusion on the application**

Having become acquainted with the materials and scientific works presented in the competition,

**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. As I already mention, the applicant not only meets the minimum national requirements in the professional field, but substantially exceeds them.

To my opinion, there is NO plagiarism in the papers presented.

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 (Theoretical and mathematical Physics).**

05.10.2020

**Prof. Plamen Lyubenov Bozhilov, Dr. Habil**