

REFeree STATEMENT

Call for academic position "Associate professor"

Scientific direction: 4.1 Physics Sciences (String theory and high energy physics) Faculty of Physics, Sofia

University, "St. Kliment Ohridski" announced in

Government Bulletin no. 63 from 30/07/2021

This statement was prepared by Assoc. Prof. Dr. Sci. Andon Angelov Rangelov, Faculty of Physics, Sofia University, as a member of the scientific jury of the call for a position Associate professor in 4.1. Physics Sciences (String theory and high energy physics) according to Document No. PД38-488/01.10.2021 of the Rector of Sofia University.

Only one candidate has submitted documents to participate in the announced call

Head Assistant Prof. Dr. Tsvetan Ivanov Vetsov, Faculty of Physics at Sofia University.

I. General description of the submitted materials

1. Application Details

For participation in the competition, the candidate Tsvetan Vetsov has submitted a list of a total of 23 titles, all of which were published in international refereed and indexed journals with an impact factor or impact rank. 12 publications are in Q1 journals, 1 is in Q2, 2 are in Q3, 4 are in Q4, 3 publication has SJR, and one book chapter. A letter from Prof. Radoslav Rashkov confirming the applicant's scientific contributions was also presented.

The submitted documents from the applicant comply with the Bulgarian national requirements and the Rules for the conditions and the procedure for acquiring scientific degrees and occupying academic positions at Sofia University, "St. Kliment Ohridski" (PURPNSZADU).

2. Candidate Details

Tsvetan Vetsov graduated from the Faculty of Physics at Sofia University, "St. Kliment Ohridski" in 2011 with a Master's Degree in Physics.

He started his doctoral studies in 2012 with the scientific adviser Prof. Radoslav Rashkov and in 2015 successfully defended his dissertation on "String approach to gauge theories".

In 2015 Tsvetan Vetsov began working as assistant professor at Theoretical Physics Division, Department of Physics, Sofia University.

From the beginning of his PhD studentship, Tsvetan Vetsov is in collaboration with:

- 1) Institute for Nuclear Researches and Nuclear Energy (BAS, Bulgaria);
- 2) Institute of Mathematics and Informatics (BAS, Bulgaria);
- 3) Joint Institute for Nuclear Research (Dubna, Russia)

and has so far participated in 10 projects (in 7 as a team member and in 3 as a leader), funded by the

3. Characteristics and analysis of the candidate's scientific works and achievements

The field of work of Tsvetan Vetsov is one of the fastest growing directions in string theory and high energy physics. For the present call Dr. Vetsov has presented 23 publications, all of them were published in worldwide refereed and indexed journals having an impact factor or impact rank. There are 12 articles in Q1 journals, one in Q2, two in Q3, four in Q4, three with SJR, and one book chapter. The main contributions of Dr. Tsvetan Vetsov can be attributed to the following research areas:

I. Fisher Information Geometry and Metrics

- I.1. of 4-dimensional black holes in modified gravity with higher derivatives;
- I.2. of 3-dimensional holographic black holes;
- I.3. of bosonic strings in a plane-parallel space-time background;
- I.4. of chains of Pais-Uhlenbeg oscillators with higher derivatives;
- I.5. of holographic systems with non-relativistic Schrödinger symmetry;

II. Entropy of entanglement

- II.1. of bosonic strings in a plane-parallel space-time background;
- II.2. of Pais-Uhlenbeg oscillator circuits with higher derivatives.
- II.3. of condensed systems of bosons and fermions;
- II.4. of dissipative quantum systems.

III. Thermodynamics of black holes

- III.1. a 4-dimensional static black hole of Desser-Sarioglu-Tekin with dark matter;
- III.2. of a 3-dimensional rotating Lifshitz hole in the theory of massive gravity.

IV. Dynamics of string solutions

- IV.1 type of spikes and magnons;
- IV.2 correlation functions.

V. Solutions in supergravity with non-Abelian T-duality.

VI. Relativistic images of accretion disks around dark compact objects

- VI.1. Black holes;
- VI.2. Naked singularities.

4. Characteristics and Assessment of the Candidate's Teaching Activity

Starting with the very first year of employment at the position of Head Assistant Professor Dr. Tsvetan Vetsov has been teaching courses at the Faculty of Physics, Sofia University. During all these years he has always exceeded the necessary workload, according to the requirements of the Sofia University, both for in-class and total teaching hours.

Dr. Vetsov 's teaching activity clearly exceeds the minimum requirements of the Faculty of Physics for the position of "Associate Professor". As a Head Assist. Prof., Dr. Tsvetan Vetsov teaches both exercises and lectures in compulsory and elective courses. Dr. Tsvetan Vetsov has

been also a thesis supervisor of three undergraduate degree students at the Faculty of Physics.

5. Critical notes and recommendations

I have no critical notes on the candidate

6. Personal impressions of the candidate

I know the candidate since his years as a student in undergraduate and graduate programs that we have, during all that time he impressed me as a clever and willing to learn student. But now I also see that Dr. Tsvetan Vetsov is a well-established scientist in the field of physics and in particular string theory and high energy physics. He is recognized both within the Bulgarian scientific community and internationally. This is evident from his publication record and the feedback from his colleagues, but also from the many international conferences he participated and organized. I have no doubt that he will successfully occupy the position of Associate Professor and that his qualities and achievements fully agree with the requirements for this position.

7. Conclusion of the application

After reviewing the materials and scientific works presented in the present call 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 Bulgarian national requirements, and the corresponding Rules of Sofia University "St. Kliment Ohridski" for the academic position of Associate Professor in the scientific field and professional direction of the competition. In particular, the applicant meets all the minimum national requirements in the professional field and no plagiarism has been detected in the scientific papers submitted at the competition.

I certainly give my **positive** assessment of the application.

II. GENERAL CONCLUSION

On the basis of the mentioned above, **I strongly recommend that** the Scientific Jury proposes to the Competent Authority for the selection at the Faculty of Physics, Sofia University "St. Kliment Ohridski" to elect Assist. Prof. Dr. Tsvetan Ivanov Vetsov for the academic position of Associate Professor in the professional direction 4.1 Physics Sciences (String theory and high energy physics).

17.11. 2021

Statement prepared by:

(Assoc. Prof. Dr. Sci. Andon Rangelov)