

# REFEREE STATEMENT

**Call for academic position "Associate professor"**

**Scientific direction: 4.1 Physics Sciences (Particle Physics)**

**Faculty of Physics, Sofia University "St. Kl. Ohridski "**

**announced in Government Bulletin no. 93 from 26/11/2019**

This statement was prepared by Assoc. Prof. dr. Venelin Valeriev Kozhuharov, 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 (Particle Physics) according to Document No. ПД38-5 / 09.01.2020 of the Rector of Sofia University.

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

**Head Assistant Prof. Dr. Peicho Stoev Petkov, Faculty of Physics at Sofia University.**

## **I. General description of the submitted materials**

### **1. Application Details**

For participation in the competition, the candidate Peicho Stoev Petkov has submitted a list of a total of 20 titles, all of which were published in international refereed and indexed journals with an impact factor. 17 publications are in Q1 journals and 3 are in Q2. A letter from Gabriela Pouliese 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**

Peicho Stoev Petkov graduated from the Faculty of Physics at Sofia University "St. Kl. Ohridski "in 2001 with a Master's Degree in Physics.

He started his doctoral studies in 2003 with the scientific adviser Prof. Leander Litov and in 2009 successfully defended his dissertation on "Research and optimization of the characteristics of Resistive Plate Chambers for the CMS detector" for his PhD degree in the specialty 01.03. 05 "Particle Physics and High Energy Physics", awarded by VAK.

The career development of Head Assist. Professor Peicho Petkov is as follows: In 2006 Peicho Petkov began working as a 4-hour employed physicist at the Department of Atomic Physics, Faculty of Science, Sofia University "St. Kl. Ohridski". In 2009 he was employed at a full time position, and in 2013 he won a competition for Head Assistant Professor at the Department of Atomic Physics, a position he has held up to this day. During this period (2006 - 2020), the candidate has held also

other positions in different scientific organizations as well as in the private sector, where he upgraded his skills.

Starting with the beginning of his PhD studentship, Peicho Petkov is a member of the CMS collaboration and has so far participated in 6 projects (in 5 as a team member and in 1 as a leader), funded by the BG-NSF, and participated in 1 project, funded by the European Commission.

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

The field of work of Peicho Petkov is one of the fastest growing directions in experimental physics. For the present call d-r Petkov has presented 20 publications, distributed as follows:

1. Physical Review Letters - 3
2. Journal of Instrumentation - 8
3. Physics Letters B - 3
4. Nature - 1
5. Journal of High Energy Physics - 3
6. Nuclear Instruments and Methods A - 2

Of these publications, 17 are published in Q1 journals and 3 – in Q2 journals. Taking into account the dynamics of the migration of journals from Q1 to Q2 and vice versa, all publications submitted by the applicant are in prestigious journals from the 1<sup>st</sup> group, according to the categories defined in the Faculty of Physics criteria for awarding academic degrees and occupation of academic positions.

The topic of the presented work is related to the study of the characteristics of resistive-plane cameras and their use as a subsystem of the CMS detector for the investigation of events with muons in the final state. As a summary, the following can be concluded:

- (a) the scientific papers meet the minimal Bulgarian national requirements and as well the additional requirements of the Sofia University "St. Kliment Ohridski" for the occupation of the academic position "Associate Professor" in the scientific field and professional direction of the competition;
- (b) there is no proven plagiarism in the scientific works submitted under the competition.

In general, the applicant's achievements and contributions can be categorized in the following areas:

3.1. Design of Resistive Plate Chambers (RPCs) and studying their characteristics without beam, including the study with/of cosmic rays - K1, K2, K3, K4, K14.

These publications are devoted to the RPCs on which the applicant has been working for more than 15 years. The important characteristics for their operation are identified. Using the RPCs, the ratio of positive to negatively charged muons in cosmic rays has been obtained.

3.2 Study of the characteristics of the RPCs with events using the LHC - K9, K11, K13, K15, K18, K19.

This group of publications includes work related to the functionality and stability of the muon system of the CMS experiment, as well as the characteristics of muon reconstruction using the complete muon system data. The results were obtained for both  $\sqrt{s} = 7$  TeV and  $\sqrt{s} = 13$

TeV.

3.3 Investigation of processes with muons in the final state using collision data from the LHC accelerator - K5, K6, K7, K8, K10, K12, K16, K17, K20.

This group includes publications that present the obtained physics results in measuring and estimating cross sections for different processes within the Standard Model and in searching for processes beyond the Standard Model. All presented results have been obtained with the key involvement of the muon system of the CMS experiment.

All results are original and essential for understanding both the operation of the CMS experiment and for understanding the Standard Model and its possible limits of applicability. Taking into account the expected life of the LHC accelerator, the results obtained in Groups 3.1 and 3.2 will be relevant for a long time and will be the basis for comparison with the new data on the operation of the CMS experiment system. The publications presented by dr. P. Petkov for this competition have been cited about 150 times, which is also indicative of their relevance.

The candidate's contribution to the aforementioned results is proven both by the letter from Dr. Gabriella Pugliese, the CMS RPC Project Manager, who presents dr. Petkov as an established expert in the field, and by personal observations on the candidate.

#### **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. Peicho Stoev Petkov has been teaching courses both at the Faculty of Physics and at the Faculty of Medicine, 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. Peicho Petkov'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. Peicho Petkov teaches both exercises and lectures in compulsory and elective courses. Dr. P. Petkov has been also a thesis supervisor of numerous undergraduate and master's degree students at the Faculty of Physics and other faculties.

#### **5. Critical notes and recommendations**

*I have no critical notes on the candidate*

#### **6. Personal impressions of the candidate**

Dr. Peicho Petkov is a well-established scientist in the field of physics and in particular particle physics. He is recognized both within the Bulgarian scientific community and internationally. This is evident from his work on the CMS experiment and the feedback from his colleagues within CMS, but also from his international contacts and work in the field of supercomputing applications. I have no doubt that he will successfully occupy the position of Associate Professor and that his qualities and achievements exceed his requirements for it.

## 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 definitely 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. Peicho Stoev Petkov for the academic position of Associate Professor in the professional direction 4.1 Physics Sciences (Particle Physics).

..02.03. 2020 ...

Statement prepared by: .....  
(Assoc. Prof. Dr. Venelin Kozhuharov)