



**Univerzitet Crne Gore  
Prirodno-matematički fakultet**

Džordža Vašingtona b.b.  
1000 Podgorica, Crna Gora

tel: +382 (0)20 245 204  
fax: +382 (0)20 245 204  
[www.pmf.ac.me](http://www.pmf.ac.me)

Broj: 1962/2  
Datum: 22 10 2021

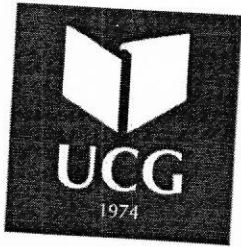
**Univerzitet Crne Gore  
Odboru za doktorske studije**

U prilogu akta dostavljamo Odluku o usvajanju Izvještaja mentora prof. dr Nataše Raičević, saradnika o napredovanju doktoranda MSc Itane Bubanje sa sjednice Vijeća od 19. 10. 2021. godine.

S poštovanjem,

Dekan,  
*Prof. dr Predrag Miranović*  
Prof. dr Predrag Miranović





Univerzitet Crne Gore  
Prirodno-matematički fakultet

Džordža Vašingtona b.b.  
1000 Podgorica, Crna Gora

tel: +382 (0)20 245 204

fax: +382 (0)20 245 204

[www.pmf.ac.me](http://www.pmf.ac.me)

Broj: 1962/1

Datum: 21 10 2021

Na osnovu člana 64 Statuta Univerziteta Crne Gore, na LXIX sjednici Vijeća održanoj 19.10.2021. godine, donijeta je

## ODLUKA

I

Usvaja se godišnji Izveštaj mentora prof dr Nataše Raičević i dr Laurenta Favarta o napredovanju MSc Itane Bubanje, studenta doktorskih studija na Prirodno-matematičkom fakultetu - studijski program Fizika.

II

Odluka se dostavlja Centru za doktorske studije Univerziteta Crne Gore.

DEKAN  
*Predrag Miranović*  
Prof. dr Predrag Miranović

## GODIŠNJI IZVJEŠTAJ MENTORA O NAPREDOVANJU DOKTORANDA

Akademska godina za koju se podnosi izvještaj <u>2020/21</u>					
<b>OPŠTI PODACI O DOKTORANDU</b>					
Titula, ime, ime roditelja, prezime	Msc Itana Miloja Bubanja				
Fakultet	Faculty of Natural Sciences and Mathematics				
Studijski program	Physics				
Broj indeksa	1/2020				
<b>MENTOR/MENTORI</b>					
Prvi mentor	Dr Nataša Raičević	University of Montenegro	Particle physics		
Drugi mentor	Dr Laurent Favart	F.R.S.-FNRS Université Libre de Bruxelles, Belgium	Particle physics		
<b>EVALUACIJA DOKTORANDA*</b>					
Koliko ste zadovoljni kvalitetom održanih susreta sa doktorandom?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input checked="" type="checkbox"/> 5
(Ako je prethodni odgovor „1“ ili „2“ dati obrazloženje i prijedloge za poboljšanje)					
Da li je definisan plan rada sa doktorandom?	<input checked="" type="checkbox"/> DA <input type="checkbox"/> NE				
Da li je doktorand ostvario napredak prema predviđenom planu rada?	<input checked="" type="checkbox"/> DA <input type="checkbox"/> NE				
(Ako je prethodni odgovor „ne“ dati obrazloženje i prijedloge za poboljšanje)					
Kvalitet napretka doktorandovog istraživačkog rada u periodu između dva izvještaja je:	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
(Ako je prethodni odgovor „1“ ili „2“ dati obrazloženje i prijedloge za poboljšanje)					
Dati ocjenu doktorandove spremnosti za konsultacije.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input checked="" type="checkbox"/> 5
Dati ocjenu planiranja i izvršavanja godišnjih istraživačkih aktivnosti i stručnog usavršavanja doktoranda.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input checked="" type="checkbox"/> 5
Dati ocjenu napretka u savladavanju metodologije naučno-istraživačkog rada.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input checked="" type="checkbox"/> 5
Dati ocjenu o aktivnostima sprovedenim na pisanju i objavljivanju naučnih radova.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input checked="" type="checkbox"/> 5
Dati ocjenu doktorandovog generalnog odnosa prema studijama.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input checked="" type="checkbox"/> 5
Dati ocjenu ukupnog kvaliteta doktorandovog rada.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input checked="" type="checkbox"/> 5

\*Ocjene su: 1 – nedovoljan, 2 – dovoljan, 3 – dobar, 4 – vrlo dobar, 5 – odličan

(Ako je prethodni odgovor „1“ ili „2“ dati obrazloženje i prijedloge za poboljšanje)

**SAGLASNOST ZA NASTAVAK STUDIJA**

Može li doktorand nastaviti studije?  Da  
 Da, uz određene uslove  
 Ne

(Ako je prethodno dat odgovor pod „b)“ ili „c)“ dati obrazloženje i prijedloge za poboljšanje)

Napomene

(Popuniti po potrebi)

**IZJAVA MENTORA**

The doctorand, Itana Bubanja, MsC, is working on the joint PhD thesis between University of Montenegro and University ULB in Brussels (Université Libre de Bruxelles).

The doctoral thesis of Itane Bubanja includes the analysis of emission of Drell-Yan (DY) pairs in proton-proton (pp) collisions at energy of 13 TeV. The proton beams are accelerated in the Large Hadron Collider (LHC) at CERN in Geneva. The emphasis will be on measuring the differential cross section of the transverse momentum of a DY pair identified by a dilepton pair ( $e^+e^-$  or  $\mu^+\mu^-$ ) created by the decay of a Z boson or virtual photon and detected in the CMS experiment. These measurements provide an understanding of complete dynamics of the interaction and are also important for accurate background measurements to detect (potentially) new physics. The results of this dissertation will be the measurements of differential cross sections for the emission of DY pairs with the highest precision in the CMS experiment so far because the complete statistics of data obtained during the RUN II period will be analysed. The analysis of experimental data and Monte Carlo simulations are performed using the C++ and Python programming languages, and the distributions and their comparison will be processed using the Root software package.

Itana Bubanja has been a member of the CMS collaboration since 2017. She did her specialist and master thesis in this collaboration. The master thesis in which the emission of DY pairs, in pp interactions (at energy of 5 TeV) was analysed, has been an excellent basis for continuing the work on the analysis of DY pairs at higher energies. In the previous period, Itana Bubanja participated in the study of emission of DY pairs in pp interactions at energy of 13 TeV by analysing the data obtained for the initial part of the RUN II period (2016 data). Itana's work in this part was mainly dedicated to checking the consistency of the obtained results through the analysis of existing theoretical models with Monte Carlo simulations. Preliminary results from the analysis of 2016 data have been obtained and publication in one of the leading journals in high-energy physics is expected soon. On behalf of the CMS collaboration, Itana Bubanja presented the obtained results from 2016 data at the EPS HEP 2021 conference, which was held online from 26<sup>th</sup> to 30<sup>th</sup> July 2021. The title of the presentation was: "Measurement of the Drell-Yan transverse momentum dependence over a wide mass range at 13 TeV from CMS", and the conference paper will be published in the journal PoS - Proceedings of Science by the end of the year.

Since Itana Bubanja is almost permanently engaged in the tasks related to CMS collaboration, she has not yet passed all the exams from her doctoral studies. She passed all the optional exams (Experimental Methods in High Energy Physics, Advance Course in Particle Physics, Methodology of Scientific Work and Presentation of Experimental Results in Particle Physics). She still has to pass one compulsory course - the Advanced Course in Quantum Mechanics.

Considering that Itana Bubanja has been already deeply involved in the analyses related to her doctoral research, we believe that she is fully prepared to continue work on her doctoral dissertation.

In Podgorica,  
23.09.2021.

Ime i prezime prvog mentora  
Prof. dr Nataša Raičević

*N. Raičević*

Ime i prezime drugog mentora  
Prof. dr Laurent Favart

*Laurent Favart*

**Prilog dokumenta sadrži:**

- Gantogram aktivnosti (za prvi izvještaj mentora)
- Objavljeni rezultati rada na izradi doktorske disertacije (za drugi izvještaj mentora)

