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Broj: 2024/01-1170  
Datum: 29.04.2024.

UNIVERZITET CRNE GORE  
SENATU  
CENTRU ZA DOKTORSKE STUDIJE

U prilogu akta dostavljam PD prijavu za Msc Stefana Šćepanovića, sa sjednice Vijeća od 23. 04. 2024. godine.

Srdačan pozdrav,



Rekan,  
*Miljan Bigović*  
Prof. dr. Miljan Bigović



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Broj: 2024/01-990/1

Datum: 29.04.2024.

Na osnovu člana 64 Statuta Univerziteta Crne Gore i člana 34 Pravila doktorskih studija, Predloga komisije za doktorske studije PMF-a broj 2024/01-1017 od 15.04.2024.godine, na CXIII sjednici Vijeća Prirodno-matematičkog fakulteta održanoj dana 23.04.2024.godine, donijeta je

**ODLUKA**

I

Predlažemo Centru za doktorske studije i Senatu Univerziteta Crne Gore da imenuje Komisiju za ocjenu podobnosti teze i kandidata pod nazivom : **"Korelacija pulsnih događaja na grafenskim nanotrakama za memristivne primjene"** kandidata Stefana Šćepanovića, u sastavu:

1. Dr Predrag Miranović, redovni profesor PMF-a UCG (naučna oblast : fizika čvrstog stanja);
2. Dr Borko Vujičić, redovni profesor PMF-a UCG (naučna oblast: fizika čvrstog stanja) i
3. Dr Jovan Mirković, redovni profesor PMF-a UCG (naučna oblast: fizika čvrstog stanja)

**Obrazloženje:**

Stefan Šćepanović podnio je Vijeću fakulteta Prijavu doktorske teze pod nazivom : **"Korelacija pulsnih događaja na grafenskim nanotrakama za memristivne primjene"**. Shodno članu 34 Pravila doktorskih studija, Vijeće je utvrdilo Predlog Odluke o imenovanju komisije za ocjenu doktorske teze i kandidata.

III

Odluka se dostavlja Senatu i Centru za doktorske studije Univerziteta Crne Gore na dalje postupanje.





## PRIJAVA TEME DOKTORSKE DISERTACIJE

OPŠTI PODACI O DOKTORANDU	
Titula, ime i prezime	Msc Stefan Šćepanović
Fakultet	Prirodno-matematički
Studijski program	Fizika
Broj indeksa	1/22
Ime i prezime roditelja	Srđan Šćepanović
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BIOGRAFIJA I BIBLIOGRAFIJA	
Obrazovanje	<ul style="list-style-type: none"><li>• Master studije iz fizike, Prirodno-matematički fakultet, Univerzitet Crne Gore, Podgorica; 2020-2022.</li><li>• Prirodno-matematički fakultet - fizika (Osnovne studije), Univerzitet Crne Gore, Podgorica; 2017-2020.</li><li>• Specijalističke studije iz elektronike, Elektrotehnički fakultet - Univerzitet Crne Gore, Podgorica; 2019-2020.</li><li>• Elektrotehnički fakultet - elektronika, telekomunikacije i računari (Osnovne studije), Univerzitet Crne Gore, Podgorica; 2016-2019.</li></ul>
Radno iskustvo	Stručno osposobljavanje u Fondaciji za promociju nauke (PRONA), Podgorica, 2020. godine
Popis radova	<ul style="list-style-type: none"><li>• S. Šćepanović, J. Mirković and A. Hassanien. Graphene nanoribbons as tunnelling tip for selective visualization of edge states, Abstract book: International meeting on superconducting quantum materials and nanodevices: Monte Super 2023, 17-21 April 2023, Budva, Montenegro, pp. 89</li></ul>
NASLOV PREDLOŽENE TEME	
Na službenom jeziku	Korelacija pulsnih događaja na grafenskim nanotrakama za memristivne primjene
Na engleskom jeziku	Correlations of spiking events on graphene nanoribbon for memristive applications
<b>Obrazloženje teme</b>	
Predložena tema se odnosi na dizajn i neinvazivnu karakterizaciju novih nano-memristivnih materijala sa robusnim funkcionalnostima pogodnim za neuromorfno inženjerstvo. Ovi materijali su napravljeni od nanočestica legiranih metala koje su pričvršćene za grafenske nanotrake sa dielektričnim medijem. Novina transporta naelektrisanja je u tome što kombinuje prednosti migracije pokretnih metalnih katjona vođenih poljem kroz anizotropnu dielektričnu matricu sa efektima gejtina kao sekundarnog kanala.	

Slično našim prethodnim studijama (Scientific Reports 2019, Nanomaterials 2021 i Particle and Particles Systems characterization 2023), pojedinačne i agregati metalnih nanočestica biće okarakterisani da bi se mapirala njihova memristivna svojstva prebacivanja u različitim dielektricima, koristeći provodnu mikroskopiju atomske sile, kao i konvencionalna mjerenja sa dvije sonde. Zbog složenosti transporta naelektrisanja u ovom sistemu, pitanja od značaja su adekvatno ispitana sistematskim studijama od jedne do nekoliko stotina nanočestica proizvedenih na vrhu AFM-a (memtips). Ovi memtips uređaji omogućavaju mjerenja bez pojmeranja i s toga se vremenski zavisne korelacije događaja prebacivanja mogu lako dobiti, čak i na sobnoj temperaturi.

**Pregled istraživanja**

1. Uvod:

Memristor [1], memorijski otpornik sa dva terminala, teorijski ga je 1971. godine predložio Leon Čua [2] kao nedostajući element kola koji ispunjava nelinearnu vezu između naelektrisanja ( $q$ ) i magnetnog fluksa ( $\Phi_m$ ); naime, otpor memristora ili memistansa ( $m$ ) =  $d\Phi_m / dq$ . Za razliku od drugih elemenata kola, memristor može da skladišti i obrađuje informacije što ga čini veoma pogodnim za projektovanje logike pune stanja sa sinaptičkim operacijama koje prevazilaze konvencionalnu Fon Nojmanovu elektronsku arhitekturu [3].

2. Najsavremenije u predloženoj oblasti istraživanja i pregled relevantne literature:

Trenutni predlog se fokusira na dizajn i neinvazivnu karakterizaciju novih nano-memristivnih materijala sa robusnim funkcionalnostima pogodnim za neuromorfni inženjering. Neuromorfni inženjering opisuje nastojanje da se imitiraju neuronske strukture i prenesu određeni aspekti njihovih naprednih funkcionalnosti u elektronska kola [4-6]. Oblast je evoluirala kasnih 1980-ih oko rada Karvera Mida na realizaciji uređaja inspirisanih neuronima, poput adaptivne mrežnjače u smislu integrisanih elektronskih analognih sistema [7]. Od tada, koncept neuromorfnog inženjeringa je proširen na pristupe u rasponu od mreža dubokog učenja, koje se obično oslanjaju na konvencionalne von-Neumannove računarske uređaje i razrađen softver, do realizacije biološki inspirisanih računarskih paradigmi. Iako je poslednji pristup još uvijek daleko od dostizanja pune tehnološke zrelosti, on pokazuje izvanredno dugoročni potencijal za aplikacije jer daje velika obećanja za realizaciju visoko paralelnih, efikasnih, biološki motivisanih računarskih uređaja [8].

Svojstva transporta memristivnih uređaja imaju veoma slične karakteristike kao prihvatanje/oslobađanje jona u biološkim sinapsama. Ova sličnost između memristora i Hodkin-Huklei moda za neurone je već pomenuta u radu L. Chua iz 1971. godine [2]. Ponašanje analognih višeslojnih prebacivačkih uređaja je veoma slično neuronskim sinapsama, gdje primjena impulsa napona izaziva postepenu reverzibilnu promjenu otpora. Modeli pulsnih neurona za pojedinačne neurone, kao i za sklopove neurona, su detaljno objašnjeni (V. Gerstner i V. Kistler [9]). U suštini, osnovno stanje neurona je stanje mirovanja i može biti pobuđen dovoljno velikim stimulusom da izloži naponski puls (akcioni potencijal). Nakon ovog pulsa, neuron je u refraktornom periodu i dalji pulsevi se efektivno potiskuju. Nakon povezivanja dva neurona sinapsom, promjena u sinaptičkoj težini, koja u suštini opisuje otpor ove veze, je vođena vremenskim intervalom između događaja pulseva u pre- i post-neuronu. Drugim riječima, adekvatan vremenski interval dovodi do jačanja sinaptičke veze, dok neusklađenost u vremenu pulseva dovodi do slabljenja veze. Ovo je takozvana plastičnost (STDP) koja je zavisna od vremena pulsa. U zavisnosti od vremenske razlike, sinaptička težina se povećava (dugotrajno potenciranje) ili smanjuje (dugotrajna depresija), što se u osnovi odnosi na učenje. Ovo ponašanje se lako reprodukuje pomoću vještačkih neuronskih i sinaptičkih uređaja zasnovanih na memristivnim uređajima [1, 10, 11]. Posljednjih godina, istraživanja su fokusirana na integraciju velikog broja takvih vještačkih sinapsi u nizove poprečnih šipki za praktične primjene. U ovom kontekstu, takođe su u fokusu istraživanja višeslojne mreže sa

jednim ili više skrivenih slojeva (slično kao u softverskom dubokom učenju). Dobar pregled istraživačkih aktivnosti u ovoj oblasti daju D. Ielmini et al. [12] i T. Chang et al. [13].

Osim što oponašaju STDP, memristivni uređaji se takođe razmatraju za realizaciju daljih biološki motivisanih funkcionalnosti, npr. adaptacija puls frekvencije je prijavljena u memristivno spregnutim oscilatorima [14, 15]. Jedan posebno važan aspekt u biološkim neuronskim mrežama je bliska veza između detekcije i obrade signala. U stvari, neuroni se ne nalaze samo u našem mozgu, već su rasprostranjeni po cijelom ljudskom tijelu i služe za prenos i obradu senzornih signala. Do sada je ovaj aspekt (spoj detekcije i obrade signala) ostao u velikoj mjeri neistražen zbog nedostatka detaljnih informacija o fizici memristivnog stanja na nanoskali. Na osnovu prethodnih studija o ugljeničnim nanocjevčicama, razvili smo metodologiju [16-18] za mapiranje svojstava prebacivanja na nanorazmjeri [19]. Drugi otvoreni problem je statistička varijansa u svojstvima prebacivanja memristivnih uređaja koja ometa njihovu upotrebu u komercijalnim aplikacijama.

U nedavnim studijama [20, 21], bavili smo se ovim problemom integracijom memristivnog kanala na AFM vrh. Metodologija koju smo usvojili u tom radu nam je omogućila da mapiramo dugoročni odziv, koji je bio nedostupan prethodnim tehnikama.

### **Cilj i hipoteze**

Da bi se kontrolisalo memristivno djelovanje, potrebno je da se prevaziđe stanje tehnike i prvo se pozabavi vremenskom složenošću stohastičkih i korelacionih procesa (uključujući i pulsne događaje) za koje se pokazalo da su do sada veoma izazovna pitanja. Predloženo je rešenje ovih pitanja na sledeći način:

- Kanalisanje filamentarnog procesa od jedne ili više nanočestica kroz vrh specijalno dizajniranog AFM vrha. Ovo omogućava mjerenja bez pomaka, što je ključ za dobijanje pouzdanih dugoročnih vremenskih i korelacionih studija.
- Drugi korak je da se iskoriste dielektrična svojstva GNR-a da se fokusira struja metalnih jona i svede stohastička varijabilnost na minimum za stabilan rad.
- Kontrolisanje nivoa memristivnog prebacivanja sa plazmionskim efektom, posebno preko pod-prag opsega ugljeničnih nanocijevi i GNR-a, što nikada ranije nije urađeno.

### **Materijali, metode i plan istraživanja**

Plan istraživanja:

Cilj istraživanja je da se iskoristi hibridno dejstvo između karakteristika efekta polja GNR ili mreže tankog filma ugljeničnih nanocijevi i difuznih memristivnih svojstava nanočestica legiranih metala. Istraživanje je dizajnirano tako da se postignu 3 prekretnice:

#### 1. Lokalno memristivno uključivanje na metalni SWCNT:

U prvoj godini se radi na optimizaciji dielektričnih svojstava GNR-a i nanočestica iz posebno pripremljenih metalnih meta, kao što je AgAu legura. Korišćenjem anizotropnih osobina SWCNT i/ili grafenske nanotrake (GNR), dielektrična matrica će biti projektovana da minimizira varijacije u filamentarnoj putanji između AFM vrha i ugljenične nanocijevi.

Da bi se identifikovao početak jonske emisije i relevantni mehanizam transporta jona, svaki tip legiranih nanočestica će se sistematski proučavati korišćenjem neinvazivnih C-AFM tehnika. Slično našim prethodnim studijama, Scientific Reports, 2019, potrebno je da tražimo optimizovanu kompoziciju, kao i dielektričnu matricu da bismo dobili stabilne memristivne akcije pri relativno niskom naponu (ispod 2 volta). Ovaj proces je veoma važan prije uključivanja SWCNTs mreže u dielektričnu matricu.

U cilju proučavanja mehanizma transporta naelektrisanja izvršice se prostorno mapiranje električnih svojstava, koristeći pristup mješovite povratne sprege. Fokusanjem na jednu po jednu nanočesticu, mogući scenariji transporta naelektrisanja, kao što su skakanje promjenljivog opsega, tuneliranje uz pomoć fluktuacije, difuzija, itd. mogu se identifikovati korišćenjem takvih lokalnih tehnika. U ovom slučaju, jedna nanočestica se može lako identifikovati kroz varijacije u lokalnim dielektričnim funkcijama, kao i fazno snimanje, tako da se IV karakteristike dobijaju na određenoj poziciji.

Ovdje je važno napomenuti da je izabrano da se izvrši karakterizacija na metalnoj jednozidnoj nanocjevčici, kako bi se precizno pratila memristivna struja, pomocu uzetih lokalnih spektra na i van nanočestice. Na taj način moguće je testirati različite legirane NP i izvući relevantna električna svojstva. Pored toga, očekuje se da će netaknuti metalni CNT pokazati slične vrijednosti za pokretljivost elektrona i šupljina, što će takođe pomoći da se izbjegne asimetrija između transporta elektrona i rupa, tj. uređaji mogu podjednako da rade i u direktnim i u reverznim karakteristikama (što je veoma važno za logičke kapije).

## 2. Dejstvo kapije memristivnih uređaja:

Jedno od najistaknutijih svojstava netaknutog poluprovodničkog SWCNT-a je sposobnost podešavanja električne struje u velikom opsegu preko gejtinga polja. Ovdje će fokus biti na srž studija mapiranjem interakcije između memristivnih radnji u blizini pod-prag opsega uređaja. Na osnovu prethodnih C-AFM studija SWCNT-a i drugih materijala, gejting je izuzetno moćan alat za kontrolu memristivne struje u velikom dinamičkom opsegu i s toga se može koristiti kao ključni parametar za variranje memristivnog stanja i izvođenje logičkih operacija. Kombinovana akcija pojačanja signala, otpornog skladištenja i logičkih operacija čini ovaj uređaj veoma relevantnim za neuromorfne proračune.

Prvo se uređaj proizvodi selektivnim deponovanjem netaknutih poluprovodničkih SWCNT-a, korišćenjem reaktora sa plutajućim katalizatorom koji je opremljen suvom elektroforetskom tehnikom. Korišćenjem ovog procesa, dobijamo uređaj koji je 95% napravljen od poluprovodničkog SWCNT-a koji direktno premošćuje metalne jastučice. Ovi metalni jastučići djeluju kao izvorne i odvodne elektrode za jednocijevni uređaj. Ponašanje poluprovodnika se verifikuje ili izmjerenim dielektričnim odzivom ili konvencionalnim efektom polja preko lokalnog AFM kontakta ili globalnog zadnjeg gejta.

U zavisnosti od predznaka AFM vrha u odnosu na SWCNT, naelektrisanja se mogu preferencijalno uskladištiti ili iscrpiti lokalno, što olakšava pokretanje i podešavanje memristivnog dejstva pri relativno niskom naponu u SWCNT-u. U svakom slučaju, preduslov je nametnut pokretačkom naponu da ne izazove strukturnu degradaciju samog SWCNT-a. Uz pomoć zadnje kapije, rad uređaja se pokreće unutar pod-prag područja kako bi se maksimizirale performanse tako da se memristivna struja pokreće kroz veliki dinamički opseg. Neka pitanja od značaja su sažeta u nastavku:

1. Mehanizam transporta naelektrisanja.
2. Maksimalna memristivna struja.
3. Prozor pouzdanosti rada „SET i RESET vrijednosti“.
4. Vrijednost memristivnog stanja.
5. Otpornost uređaja na produženi rad.
6. Optički modulirana memristivna akcija.

Pošto je od interesa primjena uređaja, ukupne IV karakteristike će se mjeriti sa konvencionalnim mjerenjima jednosmjerne struje da bi se proizveli prototip uređaji za jednostavne logičke kapije.

### 3. Optički modulirani GNR i SWCNT memristor;

Posljednja prekretnica u istraživanju je prikupljanje pojačanja bliskog polja između nanočestica, kako bi se pokrenuli putevi za efikasan transport jona. U ovim eksperimentima biće dizajniran sistem, tako da uključuje rezonantne optičke impulse sa ograničenim površinskim plazmonima nanočestica (200-500 nm). Intenzitet i vremenske oznake na ovim rezonantnim signalima bi djelovale kao obrazac učenja za memristivne uređaje. Sposobnost memristivnih struja da emuliraju profil signala sa vremenskim žigom će se istražiti za nadgledano učenje. Imajući to na umu, uređaj radi unutar pod-prag oblasti, tako da je memristivno djelovanje olakšano (kao i modulirano) izvorom svjetlosti dalekog polja. Prvo će se studija izvoditi na memtip uređajima različitog radijusa zakrivljenosti prije nego što se primjeni na makroskopske uređaje.

Moguća jaka sprega ograničenih površinskih plazmona i pojačanje bliskog polja između pojedinačnih nanočestica može djelovati kao okidač posrednog koherentnog prebacivanja u većim sistemima nanočestica. Iz tog razloga, proučavaće se vremenski zavisni efekat korelacije optički moduliranih memristora mijenjajući veličine sistema da bi se uključilo od nekoliko do par stotina nanočestica.

### Očekivani naučni doprinos

Postoji nekoliko zanimljivih očekivanih rezultata ovih istraživanja, na primjer:

1. Optimizovana sinteza, distribucija i karakterizacija i numeričke simulacije nanočestica sa anizotropnom dielektričnom matricom na raznim metalnim površinama.
2. IV mjerenja bez drifta jedne i nekoliko nanočestica na sobnoj temperaturi.
3. Izvještaj o stohastičkoj varijansi i kako na nju utiču dielektrična anizotropija i prečnik vrha.
4. Optički modulirana memristivna akcija sa GNR-om.

### Spisak objavljenih radova kandidata

S. Šćepanović, J. Mirković and A. Hassaniien. Graphene nanoribbons as tunnelling tip for selective visualization of edge states, Abstract book: International meeting on superconducting quantum materials and nanodevices: Monte Super 2023, 17-21 April 2023, Budva, Montenegro, pp. 89

### Popis literature

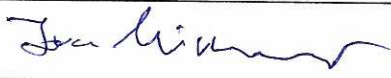
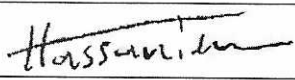

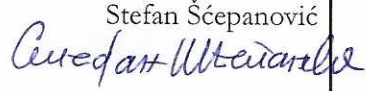
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**SAGLASNOST PREDLOŽENOG/IH MENTORA I DOKTORANDA SA PRIJAVOM**

Odgovorno potvrđujem da sam saglasan sa temom koja se prijavljuje.



Prvi mentor	prof dr. Jovan Mirković	
Drugi mentor	prof dr. Abdou Hassanien	
Doktorand	Stefan Šćepanović	
<b>IZJAVA</b>		
<p>Odgovorno izjavljujem da doktorsku disertaciju sa istom temom nisam prijavio ni na jednom drugom fakultetu.</p> <p>U Podgorici, 12. 4. 2024. god.</p> <p style="text-align: right;">Stefan Šćepanović </p>		

UNIVERZITET CRNE GORE  
PRIRODNO MATEMATIČKI FAKULTET  
FIZIKA

Broj dosijea: 1/2022

Na osnovu člana 33 Zakona o upravnom postupku (Službeni list CG, br. 56/14,20/15, 40/16 i 37/17), člana 115 Zakona o visokom obrazovanju Službeni list CG, br. 44/14, 52/14, 47/15, 40/16, 42/17, 71/17, 55/18, 3/19, 17/19, 47/19, 72/19, 74/20 104-/21) i službene evidencije, a po zahtjevu studenta Šćepanović (Srđan) Stefan, izdaje se

### UVJERENJE O POLOŽENIM ISPITIMA

Student Šćepanović (Srđan) Stefan rođen **22.07.1997.** godine u mjestu **Podgorica**, opština **Podgorica**, Republika **Crna Gora** upisan je studijske **2022/2023** godine u I godinu studija, kao student koji se **finansira samostalno** na **doktorske akademske studije**, studijski program **FIZIKA**, koji realizuje **PRIRODNO MATEMATIČKI FAKULTET** Univerziteta Crne Gore u trajanju od **3 (tri)** godine sa obimom od **180** ECTS kredita

Student je položio ispite iz sljedećih predmeta:

Red. broj	Se	Naziv predmeta	Datum polaganja	Ocjen	Uspjeh	Broj ECTS kredita
1.	1	EKSPERIMENTALNI METODI IZUČAVANJA NANOSTRUKTURA	12.12.2023.	'A'	(odličan)	10.00
2.	1	FIZIKA NANOMATERIJALA	12.12.2023.	'A'	(odličan)	10.00
3.	1	METODE FABRIKACIJE NANOSTRUKTURA	12.12.2023.	'A'	(odličan)	10.00
4.	1	VIŠI KURS KVANTNE MEHANIKE	12.12.2023.	'B'	(vrlo dobar)	10.00

Zaključno sa rednim brojem **4**.

Ostvareni uspjeh u toku studija:

- srednja ocjena položenih **(A) 9.75**
- broj osvojenih ECTS kredita **40.00** ili **66.6 %**
- indeks uspjeha **6.50**

Uvjerjenje se izdaje na osnovu službene evidencije, a u svrhu ostvarivanja prava na: (dječji dodatak, porodičnu penziju, invalidski dodatak, zdravstvenu legitimaciju, povlašćenu vožnju za gradski saobraćaj, studentski dom, studentski kredit, stipendiju, regulisanje vojne obaveze i slično).

Broj: -

Podgorica 12.04.2024.



ZG  
SEKRETAR,  
*Nadaša Ivanović*

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Број: 01-3379  
Датум, 23.11.2006 г.

Ref: \_\_\_\_\_  
Date, \_\_\_\_\_

Na osnovu člana 75 stav 2 Zakona o visokom obrazovanju (Sl.list RCG br. 60/03.) i člana 18 Statuta Univerziteta Crne Gore, Senat Univerziteta Crne Gore, na sjednici održanoj 23.11.2006. godine, donio je

## ODLUKU O IZBORU U ZVANJE

Dr **PREDRAG MIRANOVIĆ** bira se u akademsko zvanje redovni profesor Univerziteta Crne Gore za predmet Kvantna fizika na Prirodno-matematičkom fakultetu u Podgorici.

  
REKTOR,  
Prof.dr Ljubiša Stanković

Predrag Miranović  
-biografija-

Rođen sam 12. decembra 1966. godine u Podgorici, Crna Gora, gdje sam završio osnovnu školu i gimnaziju. Nakon odsluženja vojnog roka u JNA upisao sam 1986. godine studije fizike na Prirodno-matematičkom fakultetu Univerziteta Crne Gore. Studije sam završio u redovnom roku oktobra 1990. godine sa prosječnom ocjenom 9,63. Proglašen sam za najboljeg diplomiranog studenta Univerziteta Crne Gore za školsku 1989/90 i dobio Plaketu Univerziteta Crne Gore.

Odmah nakon završetka studija sam angažovan kao asistent-pripravnik na Univerzitetu Crne Gore. Upisao sam postdiplomske magistarske studije na Fizičkom fakultetu u Beogradu, i paralelno izvodio vježbe na Odsjeku za fiziku u Podgorici. Magistarski rad pod nazivom "NMR linije u visokotemperaturnim superprovodnicima" sam odbranio u oktobru 1993. godine. Kako bih se potpuno posvetio izradi doktorske disertacije u periodu 1993-1995 godine sam bio radno angažovan na Institutu za Fiziku u Zemunu. Doktorsku disertaciju "Magneto-elastični efekti u anizotropnim superprovodnicima" pod mentorstvom Ljiljane Dobrosavljević-Grujić sam odbranio u martu 1996. godine na Fizičkom fakultetu u Beogradu. Rezultati iz doktorske disertacije su objavljeni u dva rada u časopisu Američkog fizičkog društva, Physical Review B. Na osnovu toga sam nagrađen od strane Crnogorske akademije nauka i umjetnosti nagradom iz fonda Petra Vukčevića za uspjeh u istraživačkom radu u periodu 1993-1995. Nakon odbrane doktorske disertacije, u junu 1996. godine sam izabran u zvanje docent za predmet *Kvantna Mehanika* na Univerzitetu Crne Gore.

Tokom ljeta 1996. godine sam započeo saradnju sa Vladimirom G. Koganom na problemu raspodjele magnetnog polja unutar borokarbhidnih superprovodnika, a rad sam dovršio za vrijeme studijskih boravaka u Ames National Laboratory, Iowa, USA, tokom decembra 1996. i aprila 1997. godine. Dva rada, koja su proizašla tokom boravaka u Ajovi, su naišli na veoma dobar prijem kod međunarodne naučne javnosti i citirani su preko 100 puta. Na poziv profesora Kenza Mije u periodu jun 1997 – jun 1998 godine sam boravio na Univerzitetu u Tokiju, u zvanju *lecturer*. Nakon povratka iz Japana, boravio sam dva mjeseca na Oak Ridge National Laboratory, Tennessee, USA kod profesora D. K. Christena. Tamo sam dovršio rad na temu „Flux lattice symmetry in V3Si: Nonlocal effects in a high-kappa superconductor“ koji je po ocjeni Editora zavrijedio da se predstavi u Physical Review Focus (izdanje od 24. juna 1999. godine). Nakon povratka iz USA radio sam na Institutu za Fiziku u Zemunu u zvanju naučni saradnik. Na Univerzitet Crne Gore sam se vratio u ljeto 1999. godine. U zvanje vanredni profesor za predmet Kvantna fizika sam izabran 2001. godine. Na konkursu Japanskog društva za promociju nauke sam dobio postdoktorsku stipendiju koja mi je omogućila boravak na Univerzitetu u Okajami kod profesora Kazušige Mačide u periodu 2001-2003. Za vrijeme specijalizacije sam uspio da razvijem posebnu metodu za numeričko rješavanje mikroskopskih jednačina superprovodnosti koja je omogućila mnogo lakšu analizu velikog broja problema koji se tiču termodinamičkih i transportnih osobina superprovodnika.

Plodnu saradnju sa Univerzitetom u Okajami sam nastavio i nakon povratka na Univerzitet Crne Gore.

Nakon povratka iz Japana sam se, pored nauke i nastave, posvetio i drugim aktivnostima. U periodu 2004-2006 godine sam bio predsjednik Društva fizičara Srbije i Crne Gore. U oktobru 2006. godine sam izabran u zvanje redovni profesor. Vijeće Prirodno-matematičkog fakulteta me je izabralo za člana Nastavno-naučnog vijeća, odnosno Senata Univerziteta 2003 godine. Bio sam član Nacionalnog savjeta za naučno-istraživačku djelatnost. Od marta 2007 do avgusta 2008 godine obavljao sam funkciju prorektora za nastavu na Univerzitetu Crne Gore. U periodu 2008-2014 bio sam rektor Univerziteta Crne Gore. Za vanrednog člana Crnogorske akademije nauka i umjetnosti izabran sam u decembru 2008.

#### Školovanje:

1986-1990 BSc Fizika, Univerzitet Crne Gore, Prirodno-matematički fakultet

1990-1993 MSc Fizika, Univerzitet u Beogradu, Fizički fakultet

1993-1996 PhD Fizika, Univerzitet u Beogradu, Fizički fakultet  
Doktorska disertacija *Magneto-elastični efekti u anizotropnim superprovodnicima*  
Mentor: Ljiljana-Dobrosavljević-Grujić

#### Profesionalne pozicije:

1996-2001 Docent na Univerzitetu Crne Gore

1997-1998 Lecturer na Univerzitetu u Tokiju, Japan

1997-1999 Naučni saradnik, Institut za Fiziku, Zemun, Srbija

2001-2003 Stipendista Japanskog društva za promociju nauke na Univerzitetu u Okayami, Japan

2006- Redovni profesor na Univerzitetu Crne Gore

2004-2006 Predsjednik Društva fizičara Srbije i Crne Gore

2003- 2014 Član Senata Univerziteta Crne Gore

2007- 2008 Prorektor za nastavu Univerziteta Crne Gore

2007- 2010 Član Nacionalnog savjeta za naučno-istraživačku djelatnost.

2008- 2014 Rektor Univerziteta Crne Gore

2008- 2018 Vanredni član CANU

2018 - Redovni član CANU

#### Nagrade i stipendije:

- o Plaketa Univerziteta Crne Gore kao najbolji diplomirani student Univerziteta za školsku 1989/90.
- o Nagrada CANU iz fonda Petra Vukčevića za uspjeh u istraživačkom radu u periodu 1993-1995.

- Postdoktorska stipendija stipendija Japanskog društva za promociju nauke za period 2001-2003

#### Studijski boravci:

1996 (Decembar)	Ames National Laboratory, Ames, Iowa, USA (prof. V. G. Kogan)
1997 (April)	Ames National Laboratory, Ames, Iowa, USA (prof. V. G. Kogan)
1997-1998	Faculty of engineering, University of Tokio, Japan (prof. K. Miya)
1998 (Avgust)	Oak Ridge National Laboratory, Tennessee, USA (prof. D. K. Christen)
2001-2003	Department of Physics, Okayama University, Japan, (prof. K. Machida)
2004 (Januar)	Department of Physics, Okayama University, Japan, (prof. K. Machida)
2006 (Januar)	Department of Physics, Okayama University, Japan, (prof. K. Machida)
2007 (Januar)	Department of Physics, Okayama University, Japan, (prof. K. Machida)
2008 (Januar)	Department of Physics, Okayama University, Japan, (prof. K. Machida)

#### Publikacije:

Koautor sam u 40 radova objavljenih u renomiranim naučnim časopisima (koji su na SCI listi) kao što su časopisi Američkog fizičkog društva (Physical Review Letters, Physical Review B) i Japanskog fizičkog društva (Journal of Physical Society of Japan).

#### Spisak radova

1. Title: Zero bias conductance in d-wave superconductor/ferromagnet/d-wave superconductor trilayers  
Author(s): Popović, Z.; Miranović, P.; Zikić R.  
Source: PHYSICA STATUS SOLIDI B Volume: Issue: Article Number: 1700554  
Published: 2018
2. Title: Anisotropy of spin polarized transport in ferromagnet/d-wave superconductor bilayer: Role of small exchange field  
Author(s): Popović, Z.; Miranović, P.  
Source: PROGRESS OF THEORETICAL AND EXPERIMENTAL PHYSICS Volume Issue:  
Article Number:  
To Be Published: 2018
3. Title: Generic first order orientation transition of vortex lattice in type II superconductors  
Author(s): Suzuki, M. Kenta; Inoue, Kenji; Miranović, Predrag; Ichioka, Masanori; Machida, Kazushige  
Source: JOURNAL OF THE PHYSICAL SOCIETY OF JAPAN Volume: 79 Issue: 1 Article Number: 013702  
Published: 2010
4. Title: Field-angle-dependent specific heat measurements and gap determination of a heavy fermion superconductor URu2Si2  
Author(s): Yano, K.; Sakakibara, T.; Tayama, T.; Yokoyama, M.; Amitsuka, H.; Homma, Y.; Miranović, P.; Ichioka, M.; Tsutsumi, Y.; Machida, K.

Source: PHYSICAL REVIEW LETTERS Volume: 1 Issue: 1 Article Number: 017004  
Published: 2008

5. Title: Low energy excitations in the mixed state of the anisotropic s-wave superconductor CeRu2

Author(s): Yamada, Atsushi; Sakakibara, Toshiro; Custers, Jeroen; Hedo, Masato; Ōnuki, Yoshichika; Miranović, Predrag; Machida, Kazushige

Source: JOURNAL OF THE PHYSICAL SOCIETY OF JAPAN Volume: 76 Issue: 12 Article Number: 123704 Published: 2007

6. Title: Electronic thermal conductivity in a superconducting vortex state

Author(s): Adachi, H.; Miranović, P.; Ichioka, M.; Machida, K.

Source: PHYSICA C-SUPERCONDUCTIVITY AND ITS APPLICATIONS Volume: 463  
Pages: 36-39 Published: 2007

7. Title: Quasiclassical calculation of the quasiparticle thermal conductivity in a mixed state

Author(s): Adachi, Hiroto; Miranović, Predrag; Ichioka, Masanori; Machida, Kazushige

Source: JOURNAL OF MAGNETISM AND MAGNETIC MATERIALS Volume: 310 Issue: 2  
Pages: 640-642 Part: Part 1 Published: 2007

8. Title: Quasi-classical calculation of the mixed-state thermal conductivity in s- and d-wave superconductors

Author(s): Adachi, Hiroto; Miranović, Predrag; Ichioka, Masanori; Machida, Kazushige

Source: JOURNAL OF THE PHYSICAL SOCIETY OF JAPAN Volume: 76 Issue: 6 Article Number: 064708 Published: 2007

9. Title: Effect of field-dependent core size on reversible magnetization of high-kappa superconductors

Author(s): Kogan, V. G.; Prozorov, R.; Bud'ko, S. L.; Canfield, P. C.; Thompson, J. R.; Karpinski, J.; Zhigadlo, N. D.; Miranović, P.

Source: PHYSICAL REVIEW B Volume: 74 Issue: 18 Article Number: 184521 Published: 2006

10. Title: Ubiquitous V-shape density of states in a mixed state of clean limit type II superconductors

Author(s): Nakai, N.; Miranović, P.; Ichioka, M.; Hess, H. F.; Uchiyama, K.; Nishimori, H.; Kaneko, S.; Nishida, N.; Machida, K.

Source: PHYSICAL REVIEW LETTERS Volume: 97 Issue: 14 Article Number: 147001  
Published: 2006

11. Title: Basal-plane magnetic anisotropies of high-k d-wave superconductors in a mixed state: A quasiclassical approach

Author(s): Adachi, Hiroto; Miranović, Predrag; Ichioka, Masanori; Machida, Kazushige

Source: JOURNAL OF THE PHYSICAL SOCIETY OF JAPAN Volume: 75 Issue: 8 Article Number: 084716 Published: 2006

12. Title: Specific heat and low-lying excitations in the mixed state for a type-II superconductor

Author(s): Nakai, N.; Miranović, P.; Ichioka, M.; Machida, K.

Source: PHYSICAL REVIEW B Volume: 73 Issue: 17 Article Number: 172501 Published: 2006

13. Title: Theory of gap-node detection by angle-resolved specific heat measurement

Author(s): Miranović, P.; Ichioka, M.; Machida, K.; Nakai, N.

- Source: JOURNAL OF PHYSICS-CONDENSED MATTER Volume: 17 Issue: 50 Pages: 7971-7980 Published: 2005
14. Title: Theoretical study on the field dependence of the zero energy density of states in an anisotropic gap superconductors  
Author(s): Nakai, N.; Miranović, P.; Ichioka, M.; Machida, K.  
Source: JOURNAL OF PHYSICS AND CHEMISTRY OF SOLIDS Volume: 66 Issue: 8-9 Pages: 1362-1364 Published: 2005
15. Title: Field-angle-dependent specific heat in the unconventional heavy-fermion superconductor CeCoIn<sub>5</sub>  
Author(s): Aoki, H.; Sakakibara, T.; Shishido, H.; Settai, R.; Ōnuki, Y.; Miranović, P.; Machida, K.  
Source: PHYSICA B-CONDENSED MATTER Volume: 359 Pages: 410-412 Published: 2005
16. Title: Anisotropic diamagnetic response in type-II superconductors with gap and Fermi-surface anisotropies  
Author(s): Adachi, H.; Miranović, P.; Ichioka, M.; Machida, K.  
Source: PHYSICAL REVIEW LETTERS Volume: 94 Issue: 6 Article Number: 067007 Published: 2005
17. Title: Electronic state around vortex in a two-band superconductor  
Author(s): Ichioka, Masanori; Machida, Kazushige; Nakai, Noriyuki; Miranović, Predrag  
Source: PHYSICAL REVIEW B Volume: 70 Issue: 14 Article Number: 144508 Published: 2004
18. Title: Field dependence of the zero-energy density of states around vortices in an anisotropic-gap superconductor  
Author(s): Nakai, N.; Miranović, P.; Ichioka, M.; Machida, K.  
Source: PHYSICAL REVIEW B Volume: 70 Issue: 10 Article Number: 100503 Published: 2004
19. Title: Effects of nonmagnetic scatterers on the local density of states around a vortex in s-wave superconductors  
Author(s): Miranović, P.; Ichioka, M.; Machida, K.  
Source: PHYSICAL REVIEW B Volume: 70 Issue: 10 Article Number: 104510 Published: 2004
20. Title: Field-angle dependence of the zero-energy density of states in the unconventional heavy-fermion superconductor CeCoIn<sub>5</sub>  
Author(s): Aoki, H.; Sakakibara, T.; Shishido, H.; Settai, R.; Onuki, Y.; Miranović, P.; Machida, K.  
Source: JOURNAL OF PHYSICS-CONDENSED MATTER Volume: 16 Issue: 3 Pages: L13-L19 Published: 2004
21. Title: Low temperature specific heat in anisotropic superconductors  
Author(s): Dobrosavljević-Grujić, L.; Miranović, P.  
Source: PHYSICA C-SUPERCONDUCTIVITY AND ITS APPLICATIONS Volume: 397 Issue: 3-4 Pages: 117-122 Published: 2003
22. Title: Orientational field dependence of low-lying excitations in the mixed state of unconventional superconductors  
Author(s): Miranović, P.; Nakai, N.; Ichioka, M.; Machida, K.



- Source: PHYSICAL REVIEW B Volume: 68 Issue: 5 Article Number: 052501 Published: 2003
23. Title: Microscopic study of low-kappa type-II superconductors  
Author(s): Miranović, P.; Nakai, N.; Ichioka, M.; Machida, K.  
Source: PHYSICA B-CONDENSED MATTER Volume: 329 Pages: 1382-1383 Part: Part 2  
Published: 2003
24. Title: Theoretical study on vortex lattices in tetragonal superconductors  
Author(s): Nakai, Noriyuki; Miranović, Predrag; Ichioka, Masanori; Machida, Kazushige  
Source: PHYSICA C-SUPERCONDUCTIVITY AND ITS APPLICATIONS Volume: 388  
Pages: 677-678 Published: 2003
25. Title: Thermodynamics and magnetic field profiles in low-kappa type-II superconductors  
Author(s): Miranović, P.; Machida, K.  
Source: PHYSICAL REVIEW B Volume: 67 Issue: 9 Article Number: 092506 Published: 2003
26. Title: Theoretical studies on vortices in unconventional and conventional superconductors  
Author(s): Machida K, Ichioka M, Miranovic P., et al.  
Source: ACTA PHYSICA POLONICA B Volume: 34 Issue: 2 Pages: 545-548 Published: 2003
27. Title: Anisotropy of the upper critical field in superconductors with anisotropic gaps:  
Anisotropy parameters of MgB2  
Author(s): Miranović, Predrag; Machida, Kazushige; Kogan, Vladimir G.  
Source: JOURNAL OF THE PHYSICAL SOCIETY OF JAPAN Volume: 72 Issue: 2 Pages: 221-224  
Published: 2003
28. Title: Anisotropy of the superconducting state properties and phase diagram of MgB2 by  
torque magnetometry on single crystals  
Author(s): Angst, M.; Puzniak, R.; Wisniewski, A.; Roos, J.; Keller, H.; Miranović, P.;  
Jun, J.; Kazakov, S. M.; Karpinski, J.  
Source: PHYSICA C-SUPERCONDUCTIVITY AND ITS APPLICATIONS Volume: 385 Issue:  
1-2 Pages: 143-153 Published: 2003
29. Title: Reentrant vortex lattice transformation in fourfold symmetric superconductors  
Author(s): Nakai, N.; Miranović, P.; Ichioka, M.; Machida, K.  
Source: PHYSICAL REVIEW LETTERS Volume: 89 Issue: 23 Article Number: 237004  
Published: 2002
30. Title: Elastic moduli of vortex lattices within nonlocal London model  
Author(s): Miranović, P.; Kogan, V. G.  
Source: PHYSICAL REVIEW LETTERS Volume: 87 Issue: 13 Article Number: 137002  
Published: 2001
31. Title: Nonlocal effects in angular dependence of in-plane magnetization of tetragonal  
superconductors  
Author(s): Kogan, V. G.; Bud'ko, S. L.; Canfield, P. C.; Miranović, P.  
Source: PHYSICAL REVIEW B Volume: 60 Issue: 18 Pages: R12577-R12580 Published:  
1999
32. Title: Flux lattice symmetry in V3Si: Nonlocal effects in a high-kappa superconductor  
Author(s): Yethiraj, M.; Christen, D. K.; Paul, D. Mck.; Miranovic, P.; Thompson, J. R.

Source: PHYSICAL REVIEW LETTERS Volume: 82 Issue: 25 Pages: 5112-5115  
Published: 1999

33. Title: Irreversibility field analysis for  $\text{Bi}_2\text{Sr}_2\text{Ca}_2\text{Cu}_3\text{O}_x$  tapes by using axial probe  
Author(s): Rábara, M.; Yoshida, Y.; Takeuchi, T.; Miranović, P.; Miya, K.  
Source: PHYSICA C-SUPERCONDUCTIVITY AND ITS APPLICATIONS Volume: 305 Issue:  
3-4 Pages: 285-292 Published: 1998

34. Title: Resistivity and magnetic susceptibility of single-crystal  $\text{Lu}(\text{Ni}_{1-x}\text{Co}_x)(2)\text{B}_2\text{C}$  ( $x=0.0-0.09$ )  
Author(s): Cheon, K. O.; Fisher, I. R.; Kogan, V. G.; Canfield, P. C.; Miranović, P.;  
Gammel, P. L.  
Source: PHYSICAL REVIEW B Volume: 58 Issue: 10 Pages: 6463-6467 Published: 1998

35. Title: Vortex lattices in cubic superconductors  
Author(s): Kogan, V. G.; Miranović, P.; Dobrosavljević-Grujić, Lj.; Pickett, W. E.;  
Christen, D. K.  
Source: PHYSICAL REVIEW LETTERS Volume: 79 Issue: 4 Pages: 741-744 Published:  
1997

36. Title: Vortex lattice transitions in borocarbides  
Author(s): Kogan, V. G.; Bullock, M.; Harmon, B.; Miranović, P.; Dobrosavljević;  
Grujić, Lj.; Gammel, P. L.; Bishop, D. J.  
Source: PHYSICAL REVIEW B Volume: 55 Issue: 14 Pages: R8693-R8696 Published:  
1997

37. Title: GINZBURG-LANDAU THEORY OF VORTEX LATTICE STRUCTURE IN  
DEFORMABLE ANISOTROPIC SUPERCONDUCTORS  
Author(s): Miranović, P.; Dobrosavljević-Grujić, Lj.; Kogan, V. G.  
Source: PHYSICAL REVIEW B Volume: 52 Issue: 17 Pages: 12852-12857 Published:  
1995

38. Title: ON THE STRAIN-INDUCED VORTEX MASS IN ANISOTROPIC  
SUPERCONDUCTORS  
Author(s): Miranović, P.; Dobrosavljević-Grujić, Lj.  
Source: PHYSICS LETTERS A Volume: 207 Issue: 3-4 Pages: 225-229 Published: 1995

39. Title: COMMENT ON THE TRANSCENDENTAL METHOD IN THE THEORY OF NEUTRON  
SLOWING-DOWN  
Author(s): Miranovic, P.  
Source: JOURNAL OF PHYSICS A-MATHEMATICAL AND GENERAL Volume: 28 Issue: 14  
Pages: 4189-4190 Published: 1995

40. Title: VORTEX-INDUCED STRAIN AND FLUX LATTICES IN ANISOTROPIC  
SUPERCONDUCTORS  
Author(s): Kogan, V. G.; Bulaeviskii, L. N.; Miranović, P.; Dobrosavljević-Grujić, L.  
Source: PHYSICAL REVIEW B Volume: 51 Issue: 21 Pages: 15344-15350 Published:  
1995

#### Ostala stručna aktivnost:

Recenzent za časopise Physical Review Letters i Physical Review B.

Lista aktivnosti kao recenzenta Američkog fizičkog društva:

## Summary of papers sent from 2003 to 2008 to Dr. Miranovic (541154) to referee

Here is information on the papers that the American Physical Society asked you to review from 2003 to 2008 as translated from our database. Listed are the following: manuscript code at the time of the referral, the journal that asked you to review the paper, the date the referral was sent (via post or email), the date we officially received your report or response, the current title (possibly truncated) in TeX format (some characters may not display correctly), the current authors in TeX format (possibly truncated), your response as categorized by our internal conventions (possibly not reflecting the entirety of what you actually told us), and the current manuscript status, including the current journal and section type (if not published).

- BH10870** Journal: PRB Date of referral: 28Aug07 Date of response: 23Sep07  
Contribution of the surface dipole to deformation of superconductors  
*Lipavsk\{y}, Pavel/Morawetz, Klaus/Kol\{a}\v{c}ek, Jan/Brandt, Ernst Helmut/Schreiber, Michael/*  
Response from referee: Report received  
Current manuscript status: Published as PRB 77, 014506 (15 January 2008)
- BD10707** Journal: PRB Date of referral: 18May07 Date of response: 21May07  
Phenomenological theory of spin excitations in La- and Y-based cuprates  
*Zhou, Tao/Wang, Z.D./*  
Response from referee: Too busy. Not referee's field  
Current manuscript status: Published as PRB 76, 094510 (13 September 2007)
- LT10029B** Journal: PRB Date of referral: 20Feb07 Date of response: 06Mar07  
Gapless Fermi surfaces in superconducting CeCoIn<sub>5</sub>  
*Barzykin, Victor/Gor'kov, L.P./*  
Response from referee: Report received  
Current manuscript status: Published as PRB 76, 014509 (18 July 2007)
- BVR1037** Journal: PRB Date of referral: 23Aug06 Date of response: 28Aug06  
No-loss migration of preformed bosons at  $T > T_{c}$  in high-temperature superconductors  
*Kawabata, K./*  
Response from referee: Not referee's field  
Current manuscript status: No longer under consideration (PRB Brief Report)
- BQR1033** Journal: PRB Date of referral: 28Jun06 Date of response: 24Jul06  
Fermi-liquid effects in the Fulde-Ferrell-Larkin-Ovchinnikov state of two-dimensional  $d$ -wave superconductors  
*Vorontsov, Anton B./Graf, Matthias J./*  
Response from referee: Report received  
Current manuscript status: Published as PRB 74, 172504 (14 November 2006)
- LP10703** Journal: PRL Date of referral: 29Mar06 Date of response: 03Apr06  
Phase diagram of heavy fermion metal CeCoIn<sub>5</sub>

- Shaginyan, V.R./Msezane, A.Z./Stephanovich, V.A./Kirichenko, E.V./*  
 Response from referee: Too busy  
 Current manuscript status: No longer under consideration (PRL)
7. **LK10814** Journal: PRL Date of referral: 13Feb06 Date of response: 22Feb06  
**Thin Ohmic or superconducting strip with an applied ac electric current**  
*Brandt, Ernst Helmut/*  
 Response from referee: Report received  
 Current manuscript status: Published as PRB 73, 092511 (23 March 2006)
8. **LE10603** Journal: PRL Date of referral: 07Dec05 Date of response: 23Dec05  
**Exotic pairing instability in heavy fermion superconductor CeCoIn<sub>5</sub>**  
*Bussmann-Holder, A./Simon, A./Bishop, A.R./*  
 Response from referee: Report received  
 Current manuscript status: No longer under consideration (PRL)
9. **LH10288** Journal: PRL Date of referral: 16Aug05 Date of response: 29Aug05  
**Curie law, entropy excess, and superconductivity in heavy fermion metals and other strongly interacting Fermi liquids**  
*Khodel, V.A./Zverev, M.V./Yakovenko, Victor M./*  
 Response from referee: Report received  
 Current manuscript status: Published as PRL 95, 236402 (29 November 2005)
10. **BB10155** Journal: PRB Date of referral: 01Apr05 Date of response: 14Apr05  
**Anisotropic superconducting strip in an oblique magnetic field**  
*Brandt, E.H./Mikitik, G.P./*  
 Response from referee: Report received  
 Current manuscript status: Published as PRB 72, 024516 (12 July 2005)
11. **BB10155** Journal: PRB Date of referral: 14Feb05 Date of response: 02Mar05  
**Anisotropic superconducting strip in an oblique magnetic field**  
*Brandt, E.H./Mikitik, G.P./*  
 Response from referee: Report received  
 Current manuscript status: Published as PRB 72, 024516 (12 July 2005)
12. **BZ9316** Journal: PRB Date of referral: 03Jan05 Date of response: 20Jan05  
**Field-angle-resolved specific heat and thermal conductivity in the vortex phase of UPd<sub>2</sub>Al<sub>3</sub>**  
*Thalmeier, P./Watanabe, T./Izawa, K./Matsuda, Y./*  
 Response from referee: Report received  
 Current manuscript status: Published as PRB 72, 024539 (26 July 2005)
13. **BYJ920** Journal: PRB Date of referral: 30Nov04 Date of response: 08Dec04  
**Zeeman splitting effects in the phase diagram of multiple-band superconductors**  
*Dias, R.G./*  
 Response from referee: Report received  
 Current manuscript status: Published as PRB 72, 012505 (14 July 2005)
14. **BU9168** Journal: PRB Date of referral: 05Nov04 Date of response: 11Nov04  
**Effects of Fermi surface and superconducting gap structure in field-**

- rotational experiments: A possible explanation for the cusplike singularity in  $\text{YNi}_2\text{B}_2\text{C}$   
*Udagawa, Masafumi/Yanase, Youichi/Ogata, Masao/*  
 Response from referee: Report received  
 Current manuscript status: Published as PRB 71, 024511 (21 January 2005)
15. BU9168 Journal: PRB Date of referral: 16Oct04 Date of response: 01Nov04  
 Effects of Fermi surface and superconducting gap structure in field-rotational experiments: A possible explanation for the cusplike singularity in  $\text{YNi}_2\text{B}_2\text{C}$   
*Udagawa, Masafumi/Yanase, Youichi/Ogata, Masao/*  
 Response from referee: Declined to review or didn't receive referral  
 Current manuscript status: Published as PRB 71, 024511 (21 January 2005)
16. LM9096BJ Journal: PRB Date of referral: 23Sep04 Date of response: 05Oct04  
 Thermodynamics of  $\text{MgB}_2$  described by the weak-coupling two-band BCS model  
*Mishonov, Todor M./Pokrovsky, Valery L./Wei, Hongduo/*  
 Response from referee: Report received  
 Current manuscript status: Published as PRB 71, 012514 (31 January 2005)
17. BT9026 Journal: PRB Date of referral: 24Aug04 Date of response: 06Sep04  
 Field distribution of a vortex in  $d$ -wave superconductors: Quasiclassical approach versus generalized London equation  
*Laiho, R./Laiho, R./Laiho, E./Safonchik, M./Traito, K.B./*  
 Response from referee: Report received  
 Current manuscript status: Published as PRB 71, 024521 (27 January 2005)
18. BU9168 Journal: PRB Date of referral: 11Aug04 Date of response: 06Sep04  
 Effects of Fermi surface and superconducting gap structure in field-rotational experiments: A possible explanation for the cusplike singularity in  $\text{YNi}_2\text{B}_2\text{C}$   
*Udagawa, Masafumi/Yanase, Youichi/Ogata, Masao/*  
 Response from referee: Report received  
 Current manuscript status: Published as PRB 71, 024511 (21 January 2005)
19. LR9599 Journal: PRL Date of referral: 25Jun04 Date of response: 13Jul04  
 $\text{Ab initio}$  calculations of  $H_{c2}$  for Nb,  $\text{NbSe}_2$ , and  $\text{MgB}_2$   
*Arai, Masao/Kita, Takafumi/*  
 Response from referee: Report received  
 Current manuscript status: No longer under consideration (PRL)
20. BT9026 Journal: PRB Date of referral: 10Jun04 Date of response: 18Jun04  
 Field distribution of a vortex in  $d$ -wave superconductors: Quasiclassical approach versus generalized London equation  
*Laiho, R./Laiho, R./Laiho, E./Safonchik, M./Traito, K.B./*  
 Response from referee: Report received  
 Current manuscript status: Published as PRB 71, 024521 (27 January 2005)
21. LR9599 Journal: PRL Date of referral: 07May04 Date of response: 16May04  
 $\text{Ab initio}$  calculations of  $H_{c2}$  for Nb,  $\text{NbSe}_2$ , and  $\text{MgB}_2$


- Arai, Masao/Kita, Takafumi/*  
Response from referee: Report received  
Current manuscript status: No longer under consideration (PRL)
22. **BN8950** Journal: PRB Date of referral: 29Apr04 Date of response:  
12May04  
Quasiclassical theory of superconducting states under magnetic  
fields: Thermodynamic properties  
*Kusunose, Hiroaki/*  
Response from referee: Report received  
Current manuscript status: Published as PRB 70, 054509 (10 August 2004)
23. **BN8950** Journal: PRB Date of referral: 26Jan04 Date of response:  
18Feb04  
Quasiclassical theory of superconducting states under magnetic  
fields: Thermodynamic properties  
*Kusunose, Hiroaki/*  
Response from referee: Report received  
Current manuscript status: Published as PRB 70, 054509 (10 August 2004)
24. **BG9092** Journal: PRB Date of referral: 23Oct03 Date of response:  
07Nov03  
Mechanism of vortex escape from extended linear defects in the  
three-dimensional anisotropic superconductor  
*Kasatkin, A.L./Rhee, J.Y./Lee, Y.P./*  
Response from referee: Report received  
Current manuscript status: No longer under consideration (PRB regular  
article)

Број: 01-358  
Датум, 21.02.2008 г.Ref: \_\_\_\_\_  
Date, \_\_\_\_\_

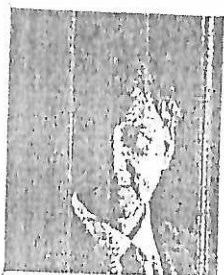
Na osnovu člana 75 stav 2 Zakona o visokom obrazovanju (Sl.list RCG br. 60/03.) i člana 18 Statuta Univerziteta Crne Gore, Senat Univerziteta Crne Gore, na sjednici održanoj 21.02.2008. godine, donio je

## ODLUKU O IZBORU U ZVANJE

Dr JOVAN MIRKOVIĆ bira se u akademsko zvanje redovni profesor Univerziteta Crne Gore za predmete: Osnovi fizičkog eksperimenta I i II, Istorija i filozofija fizike na Prirodno-matematičkom fakultetu i Fizika na nematičnim fakultetima.

  
REKTOR,  
Prof. dr Ljubiša Stanković

**Europass  
Curriculum Vitae**



**Personal information**

Surname(s) / First name(s)

Mirković Jovan

Address(es)

University Office: Faculty of Science and Mathematics, University of Montenegro, George Washington Str. bb, 81 000, Podgorica, Montenegro

Montenegrin Science Promotion Foundation PRONA Office: Studentska, lamela 10/29, 81 000 Podgorica, Montenegro

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Fax(es)

+382 20 244 608 (office)

E-mail

[mirkovic@ucg.ac.me](mailto:mirkovic@ucg.ac.me) (office)

Nationality

Montenegrin

Date of birth

July 31, 1961

Gender

Male

**Desired employment /  
Occupational field**

Physics – research and education

**Work experience**

Dates

2008 – present

Occupation or position held

Full professor

Main activities and responsibilities

Education and research in physics, materials science and nanotechnologies  
Teaching courses:

- Experimental Physics (Faculty of Sciences and Mathematics, Department of Physics)
- Biophysics (Department of Biology)
- History and Philosophy of Physics (Department of Physics)
- Modern Physics - Solid State Physics (Department of Physics) – Graduate School
- Automatic Data Acquisition (Department of Physics) – Graduate School
- General Physics (Faculty of Mechanical Engineering)
- Biophysics (Faculty of Medicine)
- Biophysics (School of Dental Medicine)
- Dental materials – physics contest (School of Dental Medicine)
- Physics and Philosophy (Faculty of Economics)
- The Japanese Economy (Faculty of Economics)
- Low temperature physics and superconductivity



Name and address of employer Faculty of Science and Mathematics, University of Montenegro, George Washington Str, bb, 81 000, Podgorica, Montenegro

Visiting professor, Graduate School of Pure & Applied Sciences, University of Tsukuba, Japan

Type of business or sector Public sector - High Education

Dates 2005 - 2010

Occupation or position held Associate professor

Main activities and responsibilities

Teaching courses:

- Experimental Physics (Faculty of Natural Sciences and Mathematics – FNSM, Department of Physics)
- Chapters of Modern Physics - Solid State Physics (FNSM, Department of Physics) – MSc level
- Automatic Data Acquisition (FNSM, Department of Physics) – MSc level
- Physics and Philosophy (Faculty of Economics)
- The Japanese Economy (Faculty of Economics)

2003 COE 21st Century Researcher, University of Tsukuba, JAPAN,

2003-2005 Researcher, 21st Century Center of Excellence Program, University of Tsukuba

2006 Visiting Professor, University of Tsukuba, Japan

Research in Superconductivity and Nano-engineering; S&T in Montenegro; Science popularization.

Projects

- „Theoretical and experimental investigation of thermodynamic and transport properties of superconductors Ministry of Education and Science”, Montenegro, 2005-2007,
- „Introduction to Experimental Physics”, Course development program (CDP+), WUS-Austria, 2004
- „Multidisciplinary Centre for Experimental Study”, WUS-Austria, 2003

Name and address of employer Faculty of Science and Mathematics, University of Montenegro, George Washington Str, bb, 20 000, Podgorica, Montenegro

Type of business or sector Public sector - High Education

Dates 1997- 2002

Occupation or position held Assistant professor

Main activities and responsibilities

Teaching courses:

- Introduction to experimental physics (Faculty of Science and Mathematics, Department of Physics)
- Physics (Faculty of Electrical Engineering)
- Physics (Faculty of Civil Engineering)

Research in vortex dynamics of high-temperature superconductors.

1997-2000 CREST (JST) Researcher, Institute of Materials Science, University of Tsukuba

Name and address of employer Faculty of Natural Sciences and Mathematics, University of Montenegro, George Washington Str bb 81 000, Podgorica, Montenegro

Type of business or sector Public sector - High Education

Dates 1996

Occupation or position held 1996 Post-doctoral STA fellow, National Research Institute for Metals, Tsukuba, Japan

Main activities and responsibilities Research – experimental study of vortex dynamics in high-temperature superconductors.

Name and address of employer Science and Technology Agency of Japan, National research Institute for Metals, Tsukuba,  
Type of business or sector Public sector – Scientific Research

Dates 1991 - 1994

Occupation or position held Researcher

Main activities and responsibilities Research – electromagnetic properties of ceramic and melted high-temperature superconductors

Name and address of employer Moscow State University "M. V. Lomonosov", Faculty of Physics, Russia  
Type of business or sector All Russian Electric Engineering Institute, Moscow, Russia

Public sector – Education and Research

Dates 1987-1990

Occupation or position held Research fellow

Main activities and responsibilities Teaching assistant

Teaching courses / experimental and theoretical exercises:  
• Physics - Faculty of Electrical Engineering, Faculty of Civil Engineering, Faculty of Metallurgy and Technology, Faculty of mathematics and Natural Sciences – Biology Department

Name and address of employer Institute of Mathematics and Physics, University of Veljko Vlahovic, Montenegro,  
Cetinjski put bb, 81 000, Titograd, Montenegro

Type of business or sector Public sector – High Education

## Education and training

Dates 1996

Title of qualification awarded PhD in Physics

Principal subjects/occupational skills covered Condensed Matter Physics – High Temperature Superconductors

Name and type of organisation providing education and training Moscow State University "M. V. Lomonosov", Faculty of Physics, Russia

Level in national or international classification PhD

Title of qualification awarded BSc in Physics (4 years studies)

Principal subjects/occupational skills covered Physics

Name and type of organisation providing education and training Institute of Mathematics and Physics, University of Veljko Vlahovic, Titograd, Montenegro, Yugoslavia

Level in national or international classification BSc

Personal skills and competences Scientific disciplines:

- Physics
- Solid State Physics.

Specific research subjects:

- Experimental solid state physics
- Superconductivity
- Nanotechnology

Experience:

- Project Management
- Foresight analysis
- Science communication

Mother tongue(s) **Montenegrin**

Other language(s)

Self-assessment European level (*)	Understanding				Speaking				Writing	
	Listening		Reading		Spoken Interaction		Spoken production			
English	C2	Proficient user	C2	Proficient user	C2	Proficient user	C2	Proficient user	C2	Proficient user
Russian	C2	Independent user	C2	Independent user	C1	Independent user	C1	Independent user	B2	Independent user

(\*) Common European Framework of Reference for Languages

Social skills and competences Chaliperson at scientific conferences; Montenegro team leader at the 42<sup>nd</sup> and 43<sup>rd</sup> International Physics Olympiad; Mentorships (BSc, MSc, PhD).

Organizational skills and competences President of Montenegrin Science Promotion Foundation PRONA; president of the National Committee of IAESTE; member of National UNESCO Commission; member of Board of Foundation Young Inventor Program for Montenegro; member of National Council for Cooperation of NGOs and Government; Member of Parliament of Montenegro 1985-99; President, Physics Program Committee for Public Elementary and High Schools; Long track record of science communication and work with young talents. Montenegro team leader, 42<sup>nd</sup> and 43<sup>rd</sup> International Physics Olympiad; Chairman of organizing committee of scientific conferences on nanoscience in Montenegro in 2008, 2009, 2011 and 2016; President of organizing committee of Summer Science School for Young Talents 2008-2012; Program Director of the Science Festival – Researchers' Night in Montenegro 2009 – 2015; Founder: The Japanese Corner; Astronomy Club; Science News Portal..

Computer skills and competences Computer skills:

- Operating systems: Windows
- Office Automation: MS Office (Word, Excel ...)
- Presentation skills: MS PowerPoint

Driving licence B type (car driving) since September 6, 1988

Additional Information 2014-2018 The first Ambassador of Montenegro to Japan

Annexes Annex 1: Jovan Mirkovic Bibliography  
Annex 2: Jovan Mirkovic. List of projects

## Books and Monographs

- [1] Jovan Mirković, „With science to the future“, chapter in the book: „Montenegro in XXI Century - in the Era of Competitiveness: Science and Technology“, Editor Jovan Mirković, Montenegrin Academy of Sciences and Arts, Special editions: Monographs and Studies, Volume 73, Tom 11, ISBN 978-86-7215-249-4, COBISS.CG-ID 16240400, Podgorica, 2010, p. 17-24.
- [2] Jovan Mirković, „Knowledge based decision-making“, chapter in the book: „Montenegro in XXI Century - in the Era of Competitiveness: Science and Technology“, Editor Jovan Mirković, Montenegrin Academy of Sciences and Arts, Special editions: Monographs and Studies, Volume 73, Tom 11, ISBN 978-86-7215-249-4, COBISS.CG-ID 16240400, Podgorica, 2010, p. 311-330.
- [3] Kulića Duro, Jovan Mirković, Sandra Tinaj, „Key Directions and Interdisciplinarity“, chapter in the book: „Montenegro in XXI Century - in the Era of Competitiveness: Science and Technology“, Editor Jovan Mirković, Montenegrin Academy of Sciences and Arts, Special editions: Monographs and Studies, Volume 73, Tom 11, pp. 111-166, ISBN 978-86-7215-249-4, COBISS.CG-ID 16240400, Podgorica, 2010
- [4] J. Mirković and K. Kadowaki / *Dynamical Resistivity Behavior above and below Vortex Lattice Melting Transition in Single Crystalline  $Bi_2Sr_2CaCu_2O_{8-x}$*  // *Advances in Superconductivity XI*, p. 557, Springer, 1999 (ISBN-10 4431702563).
- [5] Radovan Ognjanovic, Jovan Mirkovic, „Selected Topics of Physics“, The Institute for textbooks and educational teaching resources, Podgorica, Montenegro, 2012, ISBN 978-86-303-1721-7.

PhD Dissertation: „Experimental study of static and low-frequency electromagnetic properties of ceramic and melted high-temperature superconductors.“, Moscow State University “M.V. Lomonosov“, Russia, 1996.

## International scientific Journals

- [1] J. Mirković, S. Savelev, I. Kakaya, T. Kashiwagi, B. Markovic, K. Kadowaki / *Tilted vortex lattice in imidate  $Bi_2Sr_2CaCu_2O_{8-x}$  single crystals* // *Journal of Physics Conference Series* 687(1):012007 (2016).
- [2] T. Kashiwagi, T. Yamamoto, H. Minami, M. Tsujimoto, R. Yoshizaki, K. Dalfanazar, T. Kitamura, C. Watanabe, K. Nakade, T. Yasui, K. Asanuma, Y. Saiwai, Y. Shibano, T. Enomoto, H. Kubo, K. Sakamoto, T. Katsuragawa, J. B. Marković, J. Mirković, R. A. Klemm, and K. Kadowaki / *Efficient Fabrication of Intrinsic-Josephson-Junction Terahertz Oscillators with Greatly Reduced Self-Heating Effects* // *Physical Review Applied* 4(5), Nov. 2015, DOI: 10.1103/PhysRevApplied.4.054018
- [3] T. Kashiwagi, K. Nakade, B. Markovic, Y. Saiwai, H. Minami, T. Kitamura, C. Watanabe, K. Ishida, S. Sekimoto, K. Asanuma, T. Yasui, Y. Shibano, M. Tsujimoto, J. Mirkovic, K. Kadowaki // *Reflection type of terahertz imaging system using a high-Tc superconducting oscillator* // *Applied Physics Letters* 104(2):022601-022601-5 / January 2014, DOI: 10.1063/1.4861602
- [4] T. Kashiwagi, K. Nakade, Y. Saiwai, H. Minami, T. Kitamura, C. Watanabe, K. Ishida, S. Sekimoto, K. Asanuma, T. Yasui, Y. Shibano, M. Tsujimoto, T. Yamamoto, B. Markovic, J. Mirkovic, R. A. Klemm, and K. Kadowaki / *Computed tomography image using sub-terahertz waves generated from a high-Tc superconducting intrinsic Josephson junction oscillator* // *Applied Physics Letters* 104, 082603 (2014); doi: 10.1063/1.4863898
- [5] Jovan Mirković, Alexander Buznin, Takanari Kashiwagi, Takashi Yamamoto, Kazuo Kadowaki / *Crossover from Crossing to Tilted Vortex Phase in  $Bi_2Sr_2CaCu_2O_{8-x}$  Single Crystals near  $ab$ -plane* // *Physica C: Superconductivity and its applications*, Physica C 484 (2013) 77–80.
- [6] J. Mirković, T. Kashiwagi, T. Saito, T. Yamamoto, K. Kadowaki / *Geometry dependent resistivity behavior in mesoscopic  $Bi_2Sr_2CaCu_2O_{8-x}$  single crystals* // *Physica C* 471 (2011) 787–789.
- [7] Jovan Mirković, Takashi Saito, Takanari Kashiwagi, Itsuhiro Kakeya, Yuimaru Kubo, Takashi Yamamoto, Ahmet Oral, Kazuo Kadowaki / *Vortex States in Magnetic Fields near  $ab$ -plane in  $Bi_2Sr_2CaCu_2O_{8-x}$  Crystal* // *Physica C* 470 (2010) S790–S792
- [8] T. Kashiwagi, K. Nakade, B. Markovic, Y. Saiwai, H. Minami, T. Kitamura, C. Watanabe, K. Ishida, S. Sekimoto, K. Asanuma, T. Yasui, Y. Shibano, M. Tsujimoto, T. Yamamoto, J. Mirkovic, and K. Kadowaki / *Reflection type of terahertz imaging system using a high-Tc superconducting oscillator* // *Applied Physics Letters* 104, 022601 (2014)
- [9] T. Kashiwagi, K. Nakade, Y. Saiwai, H. Minami, T. Kitamura, C. Watanabe, K. Ishida, S. Sekimoto, K. Asanuma, T. Yasui, Y. Shibano, M. Tsujimoto, T. Yamamoto, B. Markovic, J. Mirkovic, R. A. Klemm, and K. Kadowaki / *Computed tomography image using sub-terahertz waves generated from a high-Tc superconducting intrinsic Josephson junction oscillator* // *Applied Physics Letters* 104, 082603 (2014)
- [10] Jovan Mirković, Takashi Saito, Takanari Kashiwagi, Takashi Yamamoto, Kazuo Kadowaki / *Crossing Vortex Lattice and Lock-in Vortex State in Mesoscopic  $Bi_2Sr_2CaCu_2O_{8-x}$  Crystal* // *Physica C* 470 (2010) S793–S794.
- [11] J. Mirković, Y. Kubo, T. Saitou, I. Kakeya, T. Yamamoto, A. Oral, K. Kadowaki / *Vortex States in Mesoscopic  $Bi_2Sr_2CaCu_2O_{8-x}$  Crystal in High Magnetic Fields* // *Physica C* 469, 1118 (2009).
- [12] Jovan Mirković, Sergey Savelev, Hirokazu Sato, Franco Nori, Kazuo Kadowaki / *Melting of Vortex Solid in Irradiated  $Bi_2Sr_2CaCu_2O_{8-x}$  Single Crystals in Tilted Magnetic Fields* // *New Journal of Physics* (ISSN: 1367-2630) Vol 8, 226 (1-14) (2006).
- [13] J. Mirković, K. Murata, A. Nakano, T. Yamamoto, I. Kakeya, and K. Kadowaki / *The Peak Effect as a Precursor to Lock-in State in  $Bi_2Sr_2CaCu_2O_{8-x}$  Single Crystal* // *AIP Conf. Proc.* (ISSN:0094-243X), Volume 850, p. 799 (2006).
- [14] J. Mirković, A. Saitou, A. Nakano, T. Yamamoto, I. Kakeya, and K. Kadowaki / *Phase Transition from Crossing Lattice to Tilted Lattice Near  $ab$ -plane in  $Bi_2Sr_2CaCu_2O_{8-x}$  Single Crystal* // *AIP Conf. Proc.* (ISSN 0094-243X), Volume 850, 2006, p. 801 (2006).
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National scientific conferences:

- [1] Kulića Đuro, Jovan Mirković, Mr. Sandra Tina: "Research and Development and Innovation Activities in Montenegro", XVI Scientific conference: "Technology, culture and development: The Western Balkans Countries on Their Way to the European Union, Conference proceeding, ed. Vlastimir Matejić, publishers: NGO «Technology and Society», Mihaelo Pupin Institute, and Faculty of Economics Subotica, pp. 295-303, ISBN 978-86-904137-9-9, COBISS SR-ID 181574024, UDK 378.014.5(082) 005.94(082), Tivat, Montenegro, September 1-3, 2010.
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PhD Dissertation:

"Experimental study of static and low-frequent electromagnetic properties of ceramic and melted high-temperature superconductors", Moscow State University "M.V. Lomonosov", Russia, 1996.

Annex 2

Jovan Mirkovic

List of projects:

- „Superconducting Nanotechnologies“, Ministry of Science, Montenegro, 2018-2019
- Youth Science Forum / Debate Science – HORIZON2020 / 2018-2020
- "Nanoscale Coherent Hybrid Devices for Superconducting Quantum Technologies" (NANOCOHYBRI) CA16216, 2017-2020
- „Physics of Nanostructures“, Ministry of Science, Montenegro, 2013-2016
- Physical properties of layered superconductors", Ministry of Science, Montenegro, 2008-2011.
- "Montenegro in XXI Century - in the Era of Competitiveness: Science and Technology", Coordinator, Montenegrin Academy of Sciences and Arts, Podgorica 2009-10
- „Science and Youth“, Montenegrin Science Promotion Foundation PRONA, 2009
- Science Festival - Researchers' Night 2009-2015, Podgorica, Montenegro (Program Director)
- Summer Physics School 2008 - 2010; Summer School of Physics and Mathematics 2011, Ivanova Konča (Program Coordinator)
- Winter Science School 2009 - 2012 (Coordinator)
- Summer School Planet in Your Hands 2011-2013
- Inquiry based science education methods program, 2011
- Students Impact on Quality Assurance of High Education in Montenegro, 2009-10
- „Science and Youth“, Montenegrin Science Promotion Foundation PRONA, 2009
- „Theoretical and experimental investigation of thermodynamic and transport properties of superconductors“, Ministry of Education and Science, Montenegro, 2005-2007
- „Introduction to Experimental Physics“, Course development program (CDP+), WUS-Austria, 2004
- Multidisciplinary Centre for Experimental Study, World University Service - Austria, 2003.

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Природно-математички факултет

Број: 765  
Датум: 31.03.2010

Број: 08-413  
Датум, 05.03.2010 г.

Ref. \_\_\_\_\_  
Date, \_\_\_\_\_

Na osnovu člana 75 stav 2 Zakona o visokom obrazovanju (Sl.list RCG br. 60/03) i člana 18 Statuta Univerziteta Crne Gore, Senat Univerziteta Crne Gore, na sjednici održanoj 25.03.2010. godine, donio je

## ODLUKU O IZBORU U ZVANJE

Dr BORKO VUJIČIĆ bira se u akademsko zvanje redovni profesor Univerziteta Crne Gore za predmete: Statistička fizika i Fizika čvrstog stanja na Prirodno-matematičkom fakultetu.

REKTOR  
*Miranović*  
Prof.dr Predrag Miranović

## Biografija

Borko Vujičić je rođen 20. 02. 1959. u Kazancima, opština Bosansko Grahovo, u bivšoj Bosni i Hercegovini, gde je i završio osnovnu školu. Gimnaziju je završio u Livnu 1978. Te godine se upisao na Odsek za fiziku Prirodno-matematičkog fakulteta Univerziteta u Beogradu. Diplomirao je 1983. na smeru *teorijska fizika* sa diplomskim radom iz oblasti statističke fizike. Od 15. 12. 1983. do danas radi na Prirodno-matematičkom fakultetu Univerziteta Crne Gore. U vojsci je proveo čitavu 1987. godinu.

Od januara 1988. do jula 1991. proveo je na usavršavanju na Fizičkom fakultetu Moskovskog državnog univerziteta na katedri za fiziku niskih temperatura i superprovodnost. Taj period je dr Vujičić iskoristio za intenzivan naučni rad i učenje. Redovno je posećivao, i u njemu aktivno učestvovao, seminar iz superprovodnosti na katedri na kojoj je bio. Takođe je redovno posećivao i seminar u Institutu za fizičke probleme, kao i opštemoskovski seminar u Fizičkom institutu Akademije nauka SSSR (FIAN). Pored toga, redovno je pohađao i specijalističke kurseve iz oblasti za koju se opredelio: superprovodnost, kvantna teorija čvrstog stanja i kinetički procesi u čvrstom stanju. Magistarski rad pod nazivom *Anomalne temperaturske zavisnosti termodinamičkih karakteristika superprovodnih superrešetki* odbranio je u februaru 1991. na Fizičkom fakultetu Univerziteta u Beogradu. U zvanje asistenta izabran je 1991.

Doktorsku disertaciju pod nazivom *Magnetne osobine visokotemperaturskih superprovodnika* odbranio je u julu 1996. na Fizičkom fakultetu Univerziteta u Beogradu. U zvanje docenta za predmete *Statistička fizika* i *Fizika čvrstog stanja* izabran je 1997, u zvanje vanrednog profesora za iste predmete 2002, a redovnog 2010.

Dr Vujičić govori ruski i engleski jezik.

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