UNIVERZITET CRNE GORE
PRIRODNO-MATEMATIČKI FAKULTET
DOKTORSKE STUDIJE

Crna Gora
UNIVERZITET CRNE GORE
PRIRODNO-MATEMATIČKI FAKULTET
Broj 1021/01-1210/2
Podgorica, 07.07.2023 god.

VIJEĆU PRIRODNO-MATEMATIČKOG FAKULTETA

Predmet: Imenovanje mentora i komentora

U skladu sa članom 29 i članom 30 Pravila doktorskih studija, Komisija za doktorske studije PMF-a je na sjednici održanoj 7. 7. 2023. godine, razmatrajući zahtjev **mr Stefana Šćepanovića** za imenovanje mentora i komentora za izradu doktorske disertacije, kao i saglasnost **prof. dr Jovana Mirkovića** i **dr Abdelrahima Hassaniena** utvrdila:

P R E D L O G

Dr Jovan Mirković, redovni profesor Prirodno-matematičkog fakulteta Univerziteta Crne Gore, imenuje se za **mentora,** a **dr Abdelrahim Hassanien**, naučni savjetnik na Institutu Jožef Stefan iz Ljubljane, za **komentora** pri izradi doktorske disertacije kandidata **mr Stefana Šćepanovića.**

Podgorica, 7. 7. 2023. god.

ZA KOMISIJU ZA DOKTORSKE STUDIJE

Goran Popivoda

UCG

UNIVERZITET CRNE GORE
PRIRODNO-MATEMATIČKI FAKULTET
Broj 02/01-410
Podgorica, 13.06.2023. 20__ god.

UNIVERZITET CRNE GORE
OBRAZAC M: Imenovanje mentora

MENTORSTVO

PREDLOŽENI MENTORI			
	Titula, ime i prezime	Ustanova i država	Naučna oblast
Prvi mentor	Prof. dr Jovan Mirković	Prirodno-matematički fakultet UCG	Fizika čvrstog stanja
Drugi mentor	Prof. dr Abdou Hassanien	Institut "Jožef Stefan" Slovenija	Fizika kondenzovanog stanja
Sjednica Vijeća organizacione jedinice na kojoj je izvršeno predlaganje mentora			

KOMPETENCIJE MENTORA (pet objavljenih radova u relevantnim časopisima)		
Prvi mentor	1	Jovan Mirkovic, Alexandre Buzdin, Takanari Kashiwagi, Takashi Yamamoto,Kazuo Kadowaki / Crossover from Crossing to Tilted Vortex Phase in Bi2Sr2CaCu2O8+d Single Crystals near ab-plane // Physica C: Superconductivity and its applications, Physica C 484 (2013) 77–80.
	2	J. Mirkovic, T. Kashiwagi, T. Saito, T. Yamamoto, K. Kadowaki / Geometry dependent resistivity behavior in mesoscopic Bi2Sr2CaCu2O8+d single crystals // Physica C 471 (2011) 787–789.
	3	S.E. Savel'ev, J. Mirković, and K. Kadowaki / The London theory of crossing-vortex lattice in high anisotropic layered superconductors // Phys. Rev. B, Vol. 64, 94521 (2001).
	4	J. Mirković, K. Kimura and K. Kadowaki / Moving Vortex States Studied by Current Flow in Single Crystal Bi2Sr2CaCu2O8+d // Phys. Rev. Lett, Vol. 82, 2374 (1999).
	5	Jovan Mirković and Kazuo Kadowaki / Vortex Dynamics in Low Magnetic Fields in Single Crystal Bi2Sr2CaCu2O8+d / Physica C, v. 341-348 pp. 1273 (2000).
Drugi mentor	1	Alexander Vahl, Niko Carstens, Thomas Strunskus, Franz Faupel & Abdou Hassanien / Diffusive Memristive Switching on the Nanoscale, from Individual Nanoparticles towards Scalable Nanocomposite Devices/ Scientific Reports, Vol 9, 17367 (2019)
	2	Niko Carstens, Alexander Vahl,Ole Gronenberg,Thomas Strunskus,Lorenz Kienle,Franz Faupel, and Abdou Hassanien / Enhancing Reliability of Studies on Single Filament Memristive Switching via an Unconventional cAFM Approach // Nanomaterials 2021, 11(2), 265; https://doi.org/10.3390/nano11020265
	3	Carstens, N., Strunskus, T., Faupel, F., Hassanien, A., Vahl, A., Neuronal-like Irregular Spiking Dynamics in Highly Volatile Memristive Intermediate-scale AgPt-Nanoparticle Assemblies. Part. Part. Syst. Charact. 2023, 40, 2200131. https://doi.org/10.1002/ppsc.202200131
	4	Hassanien, A. / Smeared d-Wave Anisotropy in a Monolayer Organic

		Superconductor // Adv. Electron. Mater. 2019, 5, 1800247. https://doi.org/10.1002/aelm.201800247
	5	Hassanien, A. / Tunable Flat Band in Large-Scale Kagome Lattice of Single Layer (BETS)2GaCl4 // Phys. Status Solidi B, 256: 1900346. (2019) https://doi.org/10.1002/pssb.201900346

PODACI O MAGISTRANDIMA I DOKTORANDIMA

	Broj magistranada		Broj doktoranada	
	trenutno	ukupno	trenutno	ukupno
Prvi mentor	1	2	1	1
Drugi mentor		1	1	8

Datum i ovjera (pečat i potpis odgovorne osobe)

U Podgorici, 7. 6. 2023

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DEKAN

MP

PERSONAL AND CONFIDENTIAL

Zewail City of Science and Technology hereby appoints Dr. Abdou Hassanien as a Full Professor at the University of Science and Technology and Director of the Center for Nano Technology (CNT) effective August 1, 2015. The Appointee will directly report to the Vice Chair for Academic Affairs. This is a 2 years contract, which can be renewed pending evaluation of teaching, research and services to the City.

1- The Appointee agrees to lead the development of the Center for Nano Technology (CNT), and to teach courses in his field of competence as needed at the University of Science and Technology. Appointee agrees as well to perform other departmental activities pertinent to the academic profession, such as, committee assignments, student advising and appropriate administrative duties.
2- For compensation of the Appointee's services, Zewail City will provide an annual net salary of 456,000 EGP, paid on 12 installments.
3- Tuition is provided for children of the Appointee who is academically qualified for admission to the University of Science and Technology.
4- Appointee and his Spouse and children are entitled to 50 % coverage for medical insurance . The other 50% will be deducted from Appointee's monthly pay. Enrollment is only possible during the first month in service.
5- In conformity with the Social Insurance Regulations, Zewail City is required to issue a check payable to the Social Insurance Authority covering Appointee's and Zewail City's social insurance contributions. It is important to note that both contributions are based on the appointee's gross monthly salary in accordance with Social Insurance Law.
6- It is agreed that this document constitutes the entire agreement between Zewail City of Science and Technology and the Appointee.
7- In case of resignation the Appointee is required to give an advance 2 months notice, the end of service will be complete when he or she performs a complete handover that includes ongoing projects, return of all City's assets and providing all accumulated documents in soft/hard copy format, as requested by the Vice Chair for Academic Affairs office.
8- If the terms of this agreement are acceptable, the Appointee should sign all copies, retain one, and return the other to the office of the Vice Chair for Academic Affairs office.

Vice Chair for Academic Affairs
Name: Sahar Obayya
Signature:
Date: 18-06-2015

I hereby confirm that I accept this contract and its terms.

Appointee Name: Abdou Hassanien
Signature: Hassanien
Date: 18.06.2015

CIRRCULUM VITAE

- Name: Abdelrahim Hassanien
- Current Institution: Jozef Stefan Institute, Ljubljana, Slovenia
- Address: Murnikova 5, SI-1000 Ljubljana
- Cell no.: +386-41-299956
- Email: abdou.hassanien@ijs.si or abdou.hassanien@gmail.com
- Highest academic position: Full Professor, Director of Center of Nanotechnology
- Field of research: Condensed matter Physics
- Focused research area: Nanoscience
- H-index: 15 in 37 refereed publications with 899 citations
(http://www.scopus.com/authid/detail.url?origin=AuthorProfile&authorId=55936393200&zone=)

Most cited article in Nature Nanotechnology 2007 with 245 citations.

Education:

Nov. 1996-May 1997

Post-doctoral fellow at NCSR Demokritos Athens, Greece.
Research Theme: *atomic force microscopy and spectroscopy of cement hardening process in collaboration with TITAN cement company in Athens, Greece.*
Host: Prof. Dr. Fani Milia.

Oct. 1992- Oct. 1996

Ph.D. in Physics, University of Ljubljana, Slovenia
Research Subject: Photo-structural properties epitaxial C_{60} thin films. Molecular resolved properties by scanning probe technique (SPM), transport in TDAE- C_{60} thin films. High quality epitaxial growth of fullerenes thin film.
Thesis advisor: Prof. dr. Dragan Mihailovic
Title: Transport and structural properties of some fullerenes compounds.

Sept. 1991-Sept 1992

Diploma in Theoretical condensed Matter Physics, Abdus Salam international center for theoretical physics, Trieste, Italy.
Research subject: Condensed Matter Physics, surface science, chemisorption of metal atoms on surfaces.
Thesis advisor: Prof. dr. Vijay Kumar
Title: Chemisorptions of Ni on Cu surfaces.

Sept. 1988- May. 1991

M.Sc. in condensed matter physics, University of Ain Shams, Cairo Egypt.

Research subject: Solid State Physics, Chalcogenide glasses, kinetics of amorphous semiconductors phase change versus external impacts such as heat

Host: Prof. Esko Kauppinen and Prof. Peter Liljeroth department of applied Physics, Aalto University, Finland.
Research Theme: Proximity effect of d-wave superconductors, Charge transport in carbon nantotube thin film transistor.

Jan 2017- Dec 2017 (funded by Collaborative Research Center (SFB), 677)

Visiting Professor, Kiel University, Kiel Germany.
Host: Prof. Franz Faupel, Institute for material Science, Kiel University.
Research Theme: Nanoscale mapping of Light harvesting metamaterials.

Oct. 2011 - Oct. 2012:

Visiting Senior researcher at Aalto University, Espoo, Finland.
Research themes: Structure and electronic properties of active carbon nanotube
devices; effect of network morphology on transport properties of carbon nanotube thin film transistor. We also have employed a new technique that combined STM or AFM with HRTEEM to characterized interface properties and their effect on Schottky barrier height. We studied the effect of carbon nanotube contacts on transport properties and performance of thin film transistor.

Major achievement: We have fabricated highly sensitive carbon nanotube thin film transistors and studied the microscopy of contacts and doping effects. The study provided a valuable information on the mechanism of single molecule detection. (Nano Res. 2012, Journal of Chemical Physics C, 2013).
Host: Prof. Esko Kauppinen

Sept. 2007- July 2009

Visiting Professor at Ohio University, Ohio, USA.
Research themes *:* Molecular scale organic superconductivity and dielectric properties of single wall carbon nanotubes.

Major achievement:
1. Nanoscale confined superconducting condensate:
We have fabricated the world smallest superconductor which is just 4 molecular pairs. This discovery opens up a great opportunity to test theories in a clean system thereby unraveling the mechanism and the nature of superconductivity right at the nanoscale.

2. Assaying metallic and semiconducting nanotubes at room temperature:
We have built a facile and fast technique to assay metallic and semiconducting nanotubes based on their dielectric response. We improve techniques further to include gating effects for application in carbon nanotube thin film transistors

Senior research Scientist
Jozef Stefan Institute, Department of Condensed Matter Physics, Slovenia
Research Interest
Scaling and proximity effects in single layer mesoscopic superconductors, Organic charge transfer salts, gating actions in gas and biomolecule sensors, atom and molecule manipulations, flexible electronics, interconnects technology, single molecule functionalization.

December 2015-May 2016.
Professor and Director of Center for Nanotechnology, Zewail City of Science and Technology, Giza, Egypt.
Research Interest:
Microfabrication of flexible nanotube thin film transistor, Nanoscale characterization of catalytic activity, Spatial resolved photovoltaic properties, Biosensors. Near field scanning probe microscopy for mapping nanoscale optical and electrical properties.

Press release:
High resolution imaging of carbon nanotubes at room temperature, AIST
(1999) Selective etching of single wall carbon nanotubes, AIST (2005)
The world smallest superconductor is just 3.5 nm, AIST (2010)

Participation in funded Japanese and European projects:

August 2010-2013:
I have been involved in center of excellence for low carbon technology (CO NOT project) to develop highly efficient energy storage devices. The total funds amounts to 10 million Euros.

April 2004-March 2008

I have been involved in CREST-JST project. A national initiative from the Japanese government to promote basic research on nanomaterials. (Total funds more than 35 million dollars).

April 2002-March 2006

I have been involved in NEDO nanocarbon project. A national initiative from Japanese government to promote basic and applied research of carbon nanotubes and related materials. The project involves about 8 companies (Fujitsu, Mitsubishi, NEC,..etc) and 10 universities around the country. The project leader was Prof. sumio Iijima who has discovered the nanotubes in
1991. (total funding more than 35 million dollars).

April 2003-March 2005

Slovenia Japan bilateral project. In collaboration with Dr. Venturini &Prof. Dr. Dragan Mihailovic. To investigate the atomic scale properties of
dichalcogenide and carbon nanotubes (50, 000 US$)

- Hassanien **(invited talk)**
  "Heteroepitaxial Patterning of $(BETS)_2GaCl_4$ on Ag(111): from Kagome Lattice to Monolayer Superconductor"
  National Institute of Material Science (NIMS), Tsukuba, Japan (21/1/2015).

- A. Hassanien **(invited talk)**
  International Workshop Advances in nanostructured superconductors: materials, properties and theory "La Cristalera" , Miraflores de la Sierra, Madrid, 4 - 7 May (2014).

- Hassanien **(invited talk)**
  Heteroepitaxial growth of organic superconductor on Ag(111)
  Aalto University, Espoo, Finland(13/6/2014).

- Hassanien **(oral Contribution)**
  International conference on "Physics and Applications of Superconducting Hybrid Nano-Engineered Devices" (SHyNeD 2014) Santa Maria di Castellabate, Italy, 31 August to 4 September 2014.

- Hassanien **(invited talk)**
  "Gating action in carbon nanotube thin film transistor"
  Kent State University, Kent, USA (8/1/2014)

- Hassanien **(invited talk)**
  "Proximity in nanoscale superconductors"
  Aalto University, Espoo, Finland (12/12/2013).

- Hassanien **(invited talk)**
  "Gating action in carbon nanotube thin film transistor"
  Espoo, Aalto University 13/12/2013.

- Hassanien **(Oral Contribution)**
  " Spatially Resolved Transport Properties of Pristine and Doped Single-Walled Carbon Nanotube Networks"
  Espoo and Tallinn, NT13, 29/6/2013 (Finland and Estonia)

- Hassanien **(invited talk)**
  "Scaling Effects in Mesoscopic Conductors and superconductors" Florida, ICSS, 17/12/2012, (USA)

- Hassanien **(two invited talks)**
  "Superconductivity at nanoscale" & "spatially resolved electronic properties on mesoscopic materials"
  Marsa Alam, Eg-MRS, 27/11/2012, (Egypt)

- Hassanien **(invited talk)**
  "Optimizing the microstructure of Carbon Nanotube thin film transistor for sensing applications"
  Shenzhen, Nanomedicine, 2/11/2012 (China)

- Hassanien **(invited talk)**

P. Umek, **A. Hassanien**, M. Tokumoto, D. Mihailovic. Carbon, 38: (11-12) 1723-1727 (2000).

6. "Scanning tunneling microscopy and spectroscopy study of carbon nanotubes"

A. Hassanien and M. Tokumoto; Molecular Materials, 13: (1-4) 51-58 (2000).

7. "Doping mechanism in single-wall carbon nanotubes studied by optical absorption" R. Jacquemin, S. Kazaoui, D. Yu, **A. Hassanien**, N. Minami, H. Kataura, Y Achiba. Synthetic metals 115: (1-3) 283-287 (2000).

8. "Atomically resolved scanning tunneling microscopy and spectroscopy of carbon nanotubes" **A. Hassanien**; Proceeding of nanotubes& nanostructures, Sardinia Italy (2000).

9. "Fermi electron wave packet interference images on carbon nanotubes at room temperature" **A. Hassanien**, M. Tokumoto, P. Umek, D. Mihailovic and A. Mrzel Applied Physics. Letters. **78**, 808 (2001).

10. "STM of short Multiwall Carbon nanotubes" **A. Hassanien**, M. Tokumoto, X. Zhao and Y. Ando. Synthetic metals **121**: (1-3) 1197-1198 (2001).

11. "Interference of Electron Waves on Carbon Nanotubes at Room Temperature" **A. Hassanien**, P. Umek, D. Vrbanic, M. Mozetic, P. Venturini, M. Tokumoto, D. Mihailovic, and S. Pejovnik, MRS Proceedings Volume 706 (2001)

12. "Scanning tunneling microscopy of aligned coaxial nanowires of polyaniline passivated carbon Nanotube" **A. Hassanien**, M. Gao, M. Tokumoto and L. Dai; Chem. Phys. Lett **342** (5-6): 479-484 (2001).

13. "Charge density modulation on single wall carbon nanotube at room temperature" **A. Hassanien**, P. Umek, A. Mrzel, D Vrbanic, Mozetic, P. Venturini, M. Tokumoto, D. Mihailovic and S. Pejovnik. Electronic properties of molecular nanostructures, Kirchberg, Austria. AIP Conf. Proc. 591(1) 359 (2001).

14. "Scanning tunneling microscopy of aligned coaxial nanowires of polyaniline passivated carbon nanotube"

A. Hassanien, M. Gao, M. Tokumoto and L. Dai. Electronic Properties of Molecular Nanostructures: XV International Winterschool/Euroconference Kirchberg, Tirol (Austria) AIP Conf. Proc. 591(1) 501 (2001).

15. "Imaging the interlayer interactions of multiwall carbon nanotubes using scanning tunneling microscopy and spectroscopy"

Shandakov, Giulio Lolli, Daniel E. Resasco, Mansoo Choi, David Tománek, and Esko Kauppinen. Nature Nanotechnology 2(3), 156-161 (2007).

27. "Effective, fast, and low temperature encapsulation of fullerene derivatives in single wall carbon nanotubes" A. Mrzel, **A. Hassanien**, Z. Liu, K. Suenaga, Y. Miyata, K. Yanagi, H. Kataura. Surface Science 601 5116–5120 (2007).

28. "Carbon nanotube metrology" A. Jorjo, E. Kaupinnen, **A. Hassanien** book chapter published in Carbon Nanotubes: Advanced Topics in the Synthesis, Structure, Properties and Applications. Edited by Mildred Dresselhaus, Gene Dresselhaus and Ado Jorio (2007).

29. "The Local-scale Study of a NanoBud Structure" Ying Tian, Delphine Chassaing, Albert G. Nasibulin, Paola Ayala, Hua Jiang, Anton S. Anisimov, **Abdou Hassanien**, Esko I. Kauppinen, Physica Status Solidi **245**, 2047 (2008).

30. "A Scanning Probe Microscopy Based Assay for Single-Walled Carbon Nanotube Metallicity" W. Lu, Y. Xiong, **A. Hassanien**, W. Zhao, M. Zheng and L. Chen,.Nano Letters, 9, 1668-1672 (2009).

31. "Superconductivity in Just Four Pairs of $(BETS)_2$-$GaCl_4$ Molecules" K. Clark, **A. Hassanien**, S. Khan, K.-F. Braun, H. Tanaka, and S.-W. Hla, Nature Nanotechnology, **5**, 261 – 265 (2010).

32."Preparation of Atomically Flat Gold Substrates for AFM Measurements" U. Maver, O. Planinsek, J. Jamnik, **A. Hassanien** and M. Gaberscek, Acta Chim. Slov., **59**, 212–219 (2012).

33. "Contactless Characterization of Electronic Properties of Nanomaterials Using Dielectric Force Microscopy" W. Lu, J. Zhang, Y. S. Li, Qi Chen, X. Wang, **A. Hassanien**, and L. Chen, The journal of physical chemistry. C, Nanomaterials and interfaces ,**116**, no. 12, str. 7158-7163 (2012)

34. "Effect of Carbon Nanotube Network Morphology on Thin Film Transistor Performance" M. Y. Timmermans, D. Estrada, A. G. Nasibulin, J. D. Wood, A. Behnam, D. M. Sun, Yutaka Ohno, J. W. Lyding, **A. Hassanien**, E. Pop and E. I. Kauppinen, Nano Res., **5**(5): 307–319 (2012).

35. "A novel facile synthesis and characterization of molybdenum nanowires" Andrej Kovič, Andrej Žnidaršič, Adolf Jesih, Aleš Mrzel, Miran Gaberšček, **Abdou Hassanien**, Nanoscale Research Letters, **7**, 567 (2012).

36. "Spatially Resolved Transport Properties of Pristine and Doped Single-Walled Carbon Nanotube Networks" Andrej Znidarsic, Antti Kaskela, Patrik Laiho, Miran Gaberscek, Yutaka Ohno, Albert G. Nasibulin, Esko I. Kauppinen and **Abdou Hassanien**, J. Phys. Chem. C, **117** (25), pp 13324–13330 (2013).

37. Hydrogen-Driven Cage Unzipping of C_{60} into Nano-Graphenes" Alexandr V. Talyzin Serhiy Luzan, Ilya V. Anoshkin, Albert G. Nasibulin, Esko I. Kauppinen, Andrzej Dzwilewski, Ahmed Kreta, Janko Jamnik, **Abdou Hassanien**, Anna Lundstedt and

6. Ahmed Samy Kreta PhD student at Ljubljana University (AFM techniques on flexible and conducting nanowires, microscopic properties of Li ion batteries, 2017).

7. Tjasa Parkelj, Master student at University of Ljubljana (Low temperature UHV STM spectroscopic techniques on few layers of elemental superconductors on metal surfaces, 2015).

8. Moheb Abdelaziz, PhD students at Kiel University (Plasmonic metamaterials for solar cell applications, 2019).

9. Mehmet Yetik PhD student at Kiel University (Near-Field mapping of light harvesting metamaterials, 2021).

Teaching Experience:

Post graduate teaching:

1. Solid state physics: PhD and Master Students, Ohio University 2007-2009.
2. Advanced lectures on Real space exploration of electronic and structural properties of Nanomaterials for PhD students at Tokyo Institute of technology, Tokyo, Japan (2010-2011).
3. Advanced course on nanoscale microscopy and spectroscopy for master and PhD students at Aalto University, Espoo, Finland (2011-2012).
4. Advanced course on nanoscale microscopy and spectroscopy for master and PhD students at Aalto University, Espoo, Finland (2016-2017).

Undergraduate Teaching:

1. Ain Shams University (Cairo, Egypt):
   Solid state physics 1997-1999
2. Ain Shams University (Cairo, Egypt)

   Solid state electronics: 1987-1991
3. Ohio University (Ohio, USA):
   Guest lecturer, general physics, Solid state physics 2007-2009.
4. Sultan Qaboos University (Oman), General Physics: fall semester of 2015-2016.