Antonio Rossi | Physicist, PhD

+39 3421272012 ♦ antonio.rossi21@gmail.com ♦ linkedin.com/in/antonio-rossi-029ab261

SKILLS

Chemical Vapor Deposition of 2D materials (Graphene and WS_2), **Angle Resolved Photo-Emission Spectroscopy (ARPES)** on **Quantum materials**. **Machine Learning** for automated measurement. **Artificial Neural Network** for assisted growth of 2D materials. Preparation and characterization of silicon carbide (SiC) substrates, **electron beam lithography** (**EBL**) and **UV lithography** for device **fabrication** (Photodetector, Spin valve, Hall contacts, Van der Pauw). Clean room and wet bench facility user. **Ultra-High Vacuum Technology**. Characterization of atomically thin crystals through **optical microscopy**, **scanning probe microscopies** and **Raman spectroscopy**. **Teaching** physics graduate courses.

Computational skills oriented to **Density Functional Theory Calculation** QUANTUM Espresso integrated suite, data analysis using **Python**, **Igor**, **Matlab, LabView** and **Origin**.

Programming: **Python**, **C** and **Bash** scripting**.**

Teaching solid state physics graduate courses

EXPERIENCE

Researcher | Center for Nanotechnology Innovation at NEST, Italian Institute of Technology

Oct 2022 – present

◊ Broad expertise in **artificial neural network aided crystal growth** and **spectroscopy of 2D materials**

- Invited Speaker: "Workshop On Twistronics and Moiré Materials: Bridging Theory And Experiments", ICTP, Trieste (It) Jan 2024
- Invited Lecturer "Solid State Physics" (6 hrs, cod. 401BB), Università di Pisa Nov 2023
- Invited Lecturer "Physics of Photonic Devices" (5 hrs, cod. 203BB), Università di Pisa May 2023
- Invited member of the Molecular Foundry's Proposal Review Board for users' proposal review, LBNL, CA, USA May 2023

Postdoctoral researcher at Berkeley National Laboratory | *Molecular Foundry at LBNL, CA, USA*

Sept 2020 – Oct 2022

◊ Angle Resolved photoemission spectroscopy-Scanning Tunneling Microscopy correlation measurements and Exciton diffusion/spectroscopy studies on 2D heterostructures.
  – Published 3 papers, 2 under revision. Presented at 2 international conferences. (APS March meeting 2022, MRS Spring Meeting 2022)

◊ Proved skills in **leading interdisciplinary projects and teams** from a variety of backgrounds to achieve **measurable results:**
  – Independently **coordinated projects with external users (Washington Saint Louis, Penn State University)**

Postdoctoral researcher at University of California, Davis | *Advanced Light Source at LBNL, CA, USA*

Feb 2018 – Aug 2020

◊ Angle Resolved photoemission spectroscopy on topological quantum material, Advisor: Prof. Inna Vishik and Dr. Eli Rotenberg
  – Published 8 papers. Presented at 2 international conferences
  – Lead the setup of Photoemission spectroscopy Laboratory at UC Davis
  – Coordinated 2 projects on correlated and topological materials

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– Collaboration with **Harvard University (MA)**. Project: Fabrication of quantum 2D vertical heterostructure for nano-ARPES

EDUCATION

PhD *Magna cum Laude* in Condensed Matter Physics | *Scuola Normale Superiore, Italy*

Nov 2014 – Feb 2018

◊ Thesis (Advisor: Dr. Camilla Coletti): *2D vertical heterostructures: Growth, properties and applications*
◊ Mentored graduate and undergraduate students from the experimental work to paper writing
◊ Published **12 papers** on **high impact journals**, presented at International Conferences

PhD internship at Physics of NanoDevice division | Groningen University, The Netherlands

Feb 2017 – Jul 2017

◊ Project (Advisor: Prof. Bart van Wees): *Detecting Spin-Orbit proximity effect in large scale CVD graphene/WS_2 interface*

Research Internship in CVD Growth | *Italian Institute of Technology, Italy*

June 2014 – Nov 2014

◊ Project (Advisor: Dr. Camilla Coletti): *CVD and epitaxial graphene growth on SiC substrate*

Master's Degree in Physics | *Università di Pisa, Italy*

Sept 2011 – Apr 2014

◊ Majoring in Physics of Materials, Semiconductors, Optoelectronics, 2D materials
◊ Thesis (Advisor: Prof. Valentina Tozzini): *Corrugated Graphene Hydrogenation with Density Functional Theory Simulations*
◊ **Published 2 papers in high impact journals.**

Bachelor's Degree in Physics | *Università di Pisa, Italy*

Sept 2007 – Jul 2011

◊ Majoring in Physics and Chemistry of Materials, Solid State Physics, Semiconductor Materials, Quantum Mechanics
◊ Thesis (Advisor: Prof. Francesco Fuso): *Au nanoparticle plasmonic excitation*

AWARDS AND CERTIFICATES

- Best Oral Contribution Postdoc Research Symposium U.C. Davis (2019)
- Ph.D. student best poster award "Graphene 2017", Barcelona (Spain), Mar 2017
- Graphene Conference Graduate Grant for "Graphene 2017", Barcelona (Spain), Mar 2017
- Graphene Conference Graduate Grant for "Graphene Canada", Montreal (Canada), Oct 2016
- 3 months Scholarship at Scuola Internazione di Studi Superiori Avanzati (S.I.S.S.A) for condensed matter atomistic simulations, 2013
- Machine Learning Fundamentals, UC San Diego on EDX
- Python for data science, UC San Diego on EDX
- Building blocks of Quantum Computers, Delft University of Technology on EDX
- Introduction to Arduino Programming, Institut Mines-Télécom on EDX

CONFERENCES

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- Oral contribution "APS March Meeting", Chicago (USA), Mar 2022
- Oral contribution "APS March Meeting", State College-PA (USA), Mar 2021 (Online)
- Oral contribution "APS March Meeting", Boston (USA), Mar 2019
- Oral contribution "FLATLAND 2017", Lausanne (Switzerland), Sep 2017
- Poster Presentation "Graphene 2017", Barcelona (Spain), Mar 2017
- Invited Seminar "University of Groningen", Groningen (The Netherlands), Dec 2016
- Invited Seminar "McGill University", Montreal (Canada), Oct 2016
- Oral Contribution "Graphene Canada", Montreal (Canada), Oct 2016
- Poster Presentation "E-MRS meeting", Lille (France), May 2016
- Oral Contribution "Graphene Flagship Workshop WP 1", Fuerteventura (Spain), Jan 2016
- Poster Presentation "GraphITA meeting", Bologna (Italy), Sept 2015

WORKSHOPS

- NSF/DOE QUANTUM SCIENCE SUMMER SCHOOL (QS3) - 2019 Penn State University, State College (PA)

SKILLS

◊ Fluent in **English**, **Italian** and **Spanish**

◊ Extensive **presentation skills** for communication with **peers** and for **outreach** purposes to the general public

LIST OF PUBBLICATIONS

A. Rossi et al., *Autonomous hyperspectral scanning tunneling spectroscopy*, Methods and Applications of Autonomous Experimentation, Chapman and Hall 2023, pp. 212–239 (2023) ISBN: 9781003359593

A.Rossi et al., *Direct Visualization of the Charge Transfer in a Graphene/α-RuCl3 Heterostructure via Angle-Resolved Photoemission Spectroscopy*, Nano Letters 23 (17), 8000-8005 (2023)

JC Thomas, **A Rossi** et al., *Autonomous scanning probe microscopy investigations over WS2 and Au{111},* npj Computational Materials 8 (1), 99 (2022)

C Trovatello, …, **A Rossi** et al., *Ultrafast hot carrier transfer in WS2/graphene large area heterostructures*, npj 2D Materials and Applications 6 (1), 24 (2022)

JR Badger, ..., **A Rossi** et al**.,** *Dirac lines and loop at the Fermi level in the time-reversal symmetry breaking superconductor LaNiGa2,* Communications Physics 5 (1), 22 (2022)

A. Rossi et al., *Electronic structure and topology across in the magnetic Weyl semimetal*, Physical Review B 104 (15), 155115 (2021)

R Krause, …, **A Rossi** et al. *Ultrafast Charge Separation in Bilayer WS2/Graphene Heterostructure Revealed by Time- and Angle-Resolved Photoemission Spectroscopy*, Frontiers in Physics 9, 668149 *(2021)*

A Rossi, G Resta, S H Lee, R D Redwing, K Dressler, C Jozwiak, A Bostwick, E Rotenberg, S Savrasov, I. Vishik, *Two Phase transition drive by surface electron doping in* WTe_2, Physical Review B 102 (12), 121110.

A L Gross, Y Hou, **A Rossi**, D Yu, IM Vishik, *Observation of long excitation lifetime in photoexcited Sb-doped* Bi_2Se_3 *nanoplatelets,* Physical Review B 103 (2), L020301

S A Sreedhar, **A Rossi**, J Nayak, Z Anderson, Y Tang, B Gregory, M Hashimoto, D-H Lu, E Rotenberg, R J Birgeneau, M Greven, M Yi, I M Vishik *Three interaction energy scales in single-layer high-*T_C *cuprate* $HgBa_2CuO_{4+d}$, Physical Review B 102, 205109 (2020)

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C Backes et al., *Production and processing of graphene and related materials*, 2D Materials 7 (2), 022001 (2020)

T J Boyle, **A Rossi**, M Walker, P Carlson, M K Miller, J Zhao, P Klavins, C Jozwiak, A Bostwick, E Rotenberg, V Taufour, I Vishik, E H da Silva Neto, *Topological surface state above the Fermi energy in Hf_2Te_2P*, Physical Review B 100 (8), 081105 (2019)

V Jovic, S Moser, A Papadogianni, R J Koch, **A Rossi**, C Jozwiak, A Bostwick, E Rotenberg, J V Kennedy, O Bierwagen, K E Smith, *The Itinerant 2D Electron Gas of the Indium Oxide (111) Surface: Implications for Carbo and Energy Conversion Applications,* Small *(2019), 1903321*

S Aeschlimann, **A Rossi**, M Ch´avez-Cervantes, R Krause, B Arnoldi, M Aeschlimann, S Forti, F Fabbri, C Coletti, I Gierz, *Direct evidence for ultrafast charge transfer in epitaxialWS_2/graphene heterostructure,* Science Advances 6 (20), eaay0761 (2020)

Y Hou, R Wang, R Xiao, L McClintock, H C Travaglini, J P Francia, H Fetsch, O Erten, S Y Savrasov, B Wang, **A Rossi**, I Vishik, E Rotenberg, D Yu, *Millimetre-long transport of photogenerated carriers in topological insulators,* Nature Communications **10**, 5723 (2019)

H Büch, **A Rossi**, S Forti, D Convertino, V Tozzini, C Coletti*, Superlubricity of epitaxial monolayer WS_2 on graphene,* Nano Research, 1-11 (2018)

A Rossi, D Spirito, F Bianco, S Forti, F Fabbri, H Büch, A Tredicucci, R Krahne, C Coletti, *Patterned tungsten disulfide/graphene heterostructures for efficient multifunctional optoelectronic devices,* Nanoscale 10 (9), 4332-4338 (2018)

S Forti, **A Rossi**, H Buch, T Cavallucci, A Sala, T O Mente¸ A Locatelli, M Magnozzi, F Bisio, M Canepa, K. Muller, S Link, U Starke, V Tozzini C Coletti, *Electronic properties of WS2 on epitaxial graphene on SiC(0001),* Nanoscale 9 (42), 16412-16419 (2017)

S Fiori, Y Murata, S Veronesi, **A Rossi**, C Coletti, S Heun, *Li-intercalated graphene on SiC(0001): an STM study*,Phys. Rev. B 96, 125429 (2017)

A Rossi, H Büch, C Di Rienzo, V Miseikis, D Convertino, A Al-Temimy, Valerio Voliani, Mauro Gemmi, Vincenzo Piazza, Camilla Coletti. *Scalable synthesis of WS2 on graphene and h-BN: an all-2D platform for light-matter transduction*, 2D Materials, 3 (3), 031013, 2016.

JH Kang, Y Ronen, Y Cohen, D Convertino, **A Rossi**, C Coletti, S Heun, Lucia Sorba, Perla Kacman, Hadas Shtrikman. *MBE growth of self-assisted InAs nanowires on graphene*, Semiconductor Science and Technology, 31 (11), 115005, 2016.

D Convertino, **A Rossi**, V Miseikis, V Piazza, C Coletti. *Thermal decomposition and chemical vapor deposition: a comparative study of multi-layer growth of graphene on SiC (000-1)*, MRS Advances, 1, 3667-3672, 2016.

F Meng, MD Thomson, F Bianco, **A Rossi**, D Convertino, A Tredicucci, Camilla Coletti, Hartmut G Roskos. *Saturable absorption of femtosecond optical pulses in multilayer turbostratic graphene*, Optics express, 24 (14), 15261-15273, 2016.

VD Camiola, R Farchioni, T Cavallucci, **A Rossi**, V Pellegrini, V Tozzini. *Hydrogen storage in rippled graphene: perspectives from multi--scale simulations*, New Frontiers in Multiscale Modelling of Advanced Materials, 2, 3, 2015.

A Rossi, S Piccinin, V Pellegrini, S de Gironcoli, V Tozzini. *Nano-Scale Corrugations in Graphene: A Density Functional Theory Study of Structure, Electronic Properties and Hydrogenation*, The Journal of Physical Chemistry C, 119 (14), 7900-7910, 2015.