

# Javad Rezvani

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## Education

- 2011-2014 PhD in physics, University of Camerino, Italy.  
*with excellency* | Major: Physics  
Thesis: "Synthesis and characterization of novel nanostructures based on Si and Ge."  
Advisor: Prof. Nicola Pinto.
- 2007-2009 M. Sc. in Physics, University of Pune, India.  
Grade B *First class*.  
Thesis: "Synthesis and characterization of the metal nanoparticles for model catalyst."  
Advisor: Prof. S. D Sartale.
- 2000-2004 B. Sc. in atomic Physics, Azad University of Tehran, Iran.

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## Work Experience

- July 2018-present Research fellow at National Frascati Laboratory, INFN.
- Dec 2016-July 2018 TRIL Fellow at Institute of material science, CNR, Elettra, Italy.
- Dec 2014-Dec 2016 PostDoc fellow in European project SIRBATT, University of Camerino, Camerino, Italy.
- Jun-Dec 2014 Research assistant at University of Camerino/ INRiM Torino, Italy.
- Jun 2011-Jun 2014 PhD student at University of Camerino, Camerino, Italy.
- Feb 2010-Aug 2010 Visiting researcher at National Central University, Taiwan.
- 2009-2010 Research assistant at University of Pune, India.

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## Teaching Experience

- Mar 2012- Jul 2014 Teaching assistant at University of Camerino, Camerino, Italy. Course: physics 1.
- July 2013 TFA Professor at University of Camerino, Camerino, Italy. Course: Sensors and Data acquisition laboratory.

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## Awards and Recognitions

- 2019 Best young researcher Award, Italian synchrotron radiation society.
- 2018 Post-Doc Fellowship Grant, National Frascati Laboratory, Italy.
- 2016 TRIL fellowship Grant, International institute of theoretical physics (ICTP), Italy.
- 2014 Post-Doc fellowship Grant, SIRBATT, University of Camerino, Italy.
- 2014 Borsa di studio, Regional project FAR, Regione Marche, University of Camerino, Italy.
- 2011 PhD scholarship, University of Camerino, Italy.
- 2010 Visiting researcher grant, National central university, Taiwan.
- 2009 M.R. Bhide Award, Raman memorial conference, India.

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## Conferences and Presentations

### Talks

- 2018 High Precision X-ray Measurements, Rome, Italy.  
A novel approach to a non-destructive depth profiling using soft x-ray spectroscopies  
**Contributed talk.**
- 2018 SuperFluctuations, San Benedetto, Italy.  
A novel approach to low dimensional superconducting Nb film properties and their potential applications  
**Invited Speaker.**
- 2018 Seminar at University of Camerino, Italy.

Advances in functional nanomaterials

**Invited Speaker.**

- 2017 SILS workshop, Trieste, Italy.  
Reversible interface formed on metal alloy oxide nanoparticles via lithiation.  
**Contributed talk.**
- 2016 SILS workshop, Bari, Italy.  
SEI dynamics in metal alloying anodes by soft x-ray absorption and photoemission spectroscopy.  
**Contributed talk.**
- 2016 SIRBATT semester meeting, Warsaw, Poland.  
Progress in understanding of solid electrolyte inter-phase.  
**Invited speaker** on behalf of Prof. A. DiCicco.
- 2016 Ultrathinsuper conference, University of Camerino, Camerino, Italy.  
Structurally induced density of states in porous Si nanowires.  
**Invited Speaker.**
- 2015 Understanding Lithium Battery Interfaces, Bilbao, Spain.  
Structural evolution of SEI in ZFO and graphite electrodes.  
**Invited Speaker.**
- 2014 Functional and advanced materials FNMA16 workshop, Camerino, Italy.  
Temperature dependence of diffusion induced Ge nanowire grown by MBE  
**Contributed talk.**
- 2014 Nanosea 2014, Marseilles, France.  
Effect of deposition parameters on Diffusion Induced Germanium Nanowires by MBE.  
**Contributed talk.**
- 2012 Nanosea 2012, Sardinia, Italy.  
Growth of diluted magnetic germanium nanowires using manganese nano-droplets  
**Contributed talk.**

**Poster presentations**

- 2018 Quantum Complex Matters, Rome, Italy.  
Substrate induced proximity effect in superconducting niobium nanofilms.
- 2018 International Conference on Multi-Condensate Superconductivity and Superfluidity in Solids and Ultra-cold Gases, Trieste, Italy.  
Dimensional crossover and incipient quantum size effects in superconducting niobium nanofilms.
- 2017 ECOSS 2017, Szeged, Hungary.  
Reversible interface formed on metal alloy oxide nanoparticles via lithiation.
- 2015 SILS 2015 Workshop, Trento, Italy.  
SEI formation in Li-ion electrodes probed by As K-edge X-ray absorption spectroscopy.
- 2015 8th conference in advanced batteries for automotive applications, Bilbao, Spain.  
Probing the evolution of the SEI in Li-ion cells by As K-edge X-ray absorption spectroscopy.
- 2014 Multi-Condensate Superconductivity and Superfluidity in Solids and Ultra-cold Gases, Camerino, Italy.  
Control and enhancement of superconductivity by engineering materials at the nanoscale.
- 2013 Scientific Day of university of Camerino, Italy.  
Sub 100 nm Si nanowires by colloidal lithography and metal assisted chemical etching.
- 2012 Scientific Day of university of Camerino, Italy.  
Germanium nanowires grown by molecular beam epitaxy.

**Attendance**

- 2017 Time resolved photoelectrons spectroscopy, NFFA, Area science park, Trieste, Italy.
- 2016 EUSpec Training School on Multiple Scattering Codes, Rene, France.
- 2013 International school on simulation of nanomaterials, ICCMNM, Frankfurt Institute for advanced studies, Germany.
- 2013 Workshop on Semiconductor detectors for medical applications, INFN, Florence, Italy.
- 2013 International conference on radiation effect on semiconductor detector and devices, INFN, Florence, Italy.

## Technical skills and Competences

- Ultra High Vacuum system operation, preparation and maintenance.
- Molecular Beam Epitaxy. Endotaxial nanowire fabrication. VLS nanowire fabrication.
- DC/RF magnetron sputtering systems.
- Thermal evaporation deposition.
- Electroless nano-fabrication
- CBD nano-fabrication.
- Electron beam deposition.
- Low dimension semiconductor/superconductor systems (2D,1D) fabrication and electrical measurement.
- Low temperature electrical measurements.
- Nanolithography.
- Electron beam lithography
- Optical lithography.
- X-Ray spectroscopy such as XPS, XRD.
- Hard/Soft X-Ray absorption spectroscopy (@ Synchrotron ).
- Scanning Electron Microscopy.
- Raman and UV-Vis Spectroscopy.
- Atomic Force Microscopy.
- Electrochemical, Metal assisted and patterned etching of the semiconductors.

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## Professional Activities

- Member of the PhD selection committee of the university of Camerino
- Member of scientific group of BEAR beam line (Elettra).
- Member of Italian synchrotron radiation society .
- Referee of Journal of Crystal Growth, Elsevier.
- Referee of Journal of Nanoresearch letters, Springer.
- Referee of Journal of Physics D, Applied Physics, IOP.
- Referee of Journal of Advanced surface science, Elsevier.
- Referee of Journal of Radiation Physics and Chemistry, Sciencedirect.

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## Affiliations

- Istituto Officina dei Materiali (IOM), Italian National Research Council (CNR), Trieste, Italy.
- International institute of theoretical physics, Trieste, Italy.
- National Laboratory of Frascati, INFN, Frascati, Italy.
- Istituto nazionale di Ricerca metrologica (INRiM), Torino, Italy.

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## Computer Skills

- Windows, Linux.
- Programming in C++, NI-Labview, Python.
- Mathematica, Matlab.
- Latex, MS Office.
- ANSYS HFSS, COMSOL.
- AutoCAD.
- GNXAS, ATHENA.

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## Languages

- Italian: Fair
- English: Fluent.
- French: Basic Knowledge.
- Persian: Native

## List of Publications

- The hidden energy tail of low energy electrons in EUV lithography  
Roberto Fallica; **Javad Rezvani**; Stefano Nannarone; Sergei Borisov; Danilo De Simone; Sergey Babin; Gian Lorusso; Geert Vandenberghe.  
**SPIE, Advances in Patterning Materials and Processes XXXVI; 1096009 (2019).**
- Structural Evolution of MoO<sub>3</sub> Thin Films Deposited on Copper Substrates upon Annealing: An X-ray Absorption Spectroscopy Study.  
Salvatore Macis, **Javad Rezvani**, Ivan Davoli, Giannantonio Cibir, Bruno Spataro, Jessica Scifo, Luigi Faillace, Augusto Marcelli.  
**Condensed Matter, 4, 2, 41 (2019).**
- The Potential of EuPRAXIA@ SPARCLAB for Radiation Based Techniques. Antonella Balerna, Samanta Bartocci, Giovanni Batignani, Alessandro Cianchi, Enrica Chiadroni, Marcello Coreno, Antonio Cricenti, Sultan Dabagov, Andrea Di Cicco, Massimo Faiferri, Carino Ferrante, Massimo Ferrario, Giuseppe Fumero, Luca Giannessi, Roberto Gunnella, Juan José Leani, Stefano Lupi, Salvatore Macis, Rosa Manca, Augusto Marcelli, Claudio Masciovecchio, Marco Minicucci, Silvia Morante, Enrico Perfetto, Massimo Petrarca, Fabrizio Pusceddu, **S.J. Rezvani**, José Ignacio Robledo, Giancarlo Rossi, Héctor Jorge Sánchez, Tullio Scopigno, Gianluca Stefanucci, Francesco Stellato, Angela Trapananti, Fabio Villa.  
**Condensed Matter, 4, 1, 30 (2019).**
- Substrate-Induced Proximity Effect in Superconducting Niobium Nanofilms.  
**J. Rezvani**, Andrea Perali, Matteo Fretto, Natascia De Leo, Luca Flammia, Milorad Milošević, Stefano Nannarone, Nicola Pinto.  
**Condensed Matter, 4, 1, 4 (2018).**
- Experimental Investigation of Photoemission from New Satellite Surface Materials.  
Millan F. Diaz, John Bonnel, Stuart Bale, **S.J. Rezvani**, Angelo Giglia, S. Nannarone and Mike Gruntman.  
**Journal of Spacecraft and Rockets - AIAA ARC, 56, 1, 248 (2018).**
- Dimensional crossover and incipient quantum size effects in superconducting niobium nanofilms N. Pinto, S.J. Rezvani, A. Perali, L. Flammia, C. Cassiogo, N. De Leo, M. Fretto and V. Lacquaniti.  
**Scientific reports, 8, 4710 (2018).**
- A new XUV optical end-station to characterize compact and flexible photonic devices using synchrotron radiation.  
Augusto Marcelli, Mikhail I. Mazuritskiy, Sultan B. Dabagov, Dariush Hampai, Alexander M. Lerer, Ekaterina A. Izotova, Alessandro D'Elia, Stefano Turchini, Nicola Zema, Fabio Zuccaro, Monica de Simone, **S.J. Rezvani** and Marcello Coreno.  
**Journal of Instrumentation, 13, C03035 (2018).**
- SEI dynamics in metal oxide conversion electrodes of Li ion batteries.  
**S.J. Rezvani**, R. Gunnella, F. Nobili, S. Passerini, A. Mushtaq and A. Di Cicco.  
**Journal of physical chemistry C, 121(47), 26379 (2017).**
- Enhancement of interfacial stability of LiMn<sub>2</sub>O<sub>4</sub> cathode by Al<sub>2</sub>O<sub>3</sub> coating: electrochemical and spectroscopic characterization.  
Marta Pasqualini; Silvia Calcaterra; Fabio Maroni; **S. J. Rezvani**; Andrea Di Cicco; Sam Alexander; Hanna Rajantie; Roberto Tossici; Francesco Nobili.  
**Electrochimica Acta, 258, 175-181 (2017).**
- Binder induced structural evolutions effect on Li ion battery performance  
**S. J. Rezvani**, R. Gunnella, A. Witkowska, F. Nobili, M. Pasqualini, S. Passerini and A. Di Cicco.  
**Applied surface science, 435, 1029 (2017).**
- Is the Solid Electrolyte Interphase an extra-charge reservoir in Li-ion batteries?  
**S. J. Rezvani**, R. Gunnella, A. Witkowska, F. Mueller, F. Nobili, M. Pasqualini, S. Passerini and A. Di Cicco.  
**ACS Applied materials and interfaces, 9, 45704576 (2017).**
- Development of non-fluorinated electrode based on Li<sub>3</sub>V<sub>1.95</sub>Ni<sub>0.05</sub>(PO<sub>4</sub>)<sub>3</sub>/C with prolonged cycle life: A comparison among Na-Alginate, Na-carboxymethyl cellulose and poly (acrylic acid) binders  
M. Secchiaroli, S. Calcaterra, H. Y. Tran, **S. J. Rezvani**, F. Nobili, R. Marassi, M. Wohlfahrt-Mehrens and S. Dsokea.  
**Journal of The Electrochemical Society 164 (4), A672-A683 (2017).**
- Double-edge x-ray absorption study of LiFe<sub>1-x</sub>Ni<sub>x</sub>PO<sub>4</sub> cathode materials

- Marco Minicucci, Lubna Tabassam, Riccardo Natali; Giorgio Mancini; S. J. Rezvani and Andrea Di Cicco. *Journal of materials science* 52 (9), 4886-4893 (2017)
- New Developments in HPGe Detectors for High Resolution Detection  
D.R. Napoli, G. Maggioni, Sara Carturan, J. Eberth, V. Boldrini, Davide De Salvador, Enrico Napolitani, P. Cocconi, G. Della Mea, Michele Gelain, R. Gunnella, M.G. Grimaldi, M. Loriggiola, Gino Mariotto, Nicola Pinto, W. Raniero, S. J Rezvani, S. Riccetto, D. Rosso, F. Sgarbossa, S. Tati  
*Acta Physica Polonica Series B* 48(3):387 (2017).
  - Electrical contacts on Silicon nanowires prepared by metal assisted etching: A comparative approach.  
Luca D'Ortenzi, Rosalia Monsu, Eleonora Cara, Matteo Fretto, Seifeddine Kara, S. J. Rezvani, Luca Boarino.  
*Nanoscale Research Letters* 11 (1), 468 (2016).
  - Effect of carrier tunnelling on the structure of metal assisted etched Si nanowires  
S.J. Rezvani, N. Pinto, L. Boarino, F. Celegato, L. Croin, D. Antonioli, M. Fretto, P. Rizzi.  
*Nanotechnology*, 27, 34 (2016).
  - Rapid formation of single crystalline Ge nanowires by anodic metal assisted etching  
S. J. Rezvani, L. Boarino, N. Pinto.  
*CrystEngComm*, 18, 7843 (2016).
  - Geometrically induced electron-electron interaction in semiconductor nanowires  
N. Pinto, S. J. Rezvani, L. Favre, I. Berbezier, M. Fretto and L. Boarino.  
*Applied physics letter*, 109 (2016).
  - Local structure and stability of SEI in graphite and ZFO electrodes probed by As K-edge absorption spectroscopy  
S. J. Rezvani, M. Ciambezi, R. Gunnella, M. Minicucci, M. A. Munoz, F. Nobili, M. Pasqualini, S. Passerini, C. Schreiner, A. Trapananti, A. Witkowska and A. Di Cicco.  
*J. Phys. Chem. C*, 120, 42874295 (2016).
  - Thermally activated tunnelling in porous silicon nanowires with embedded Si quantum dots  
S. J. Rezvani, N. Pinto, E. Enrico, L. D'Ortenzi, A. Chiodoni and L. Boarino.  
*Journal of Physics D*, 49, 10 (2016).
  - Supersaturation state effect in diffusion induced Ge nanowires growth at high temperatures  
S. J. Rezvani, L. Favre, F. Celegato, L. Boarino, Isabelle Berbezier and N. Pinto.  
*Journal of Crystal Growth*, 436, 51-55 (2015).
  - Wet chemical treatments of high purity Ge crystals for  $\gamma$ -ray detectors: Surface structure, passivation capabilities and air stability  
S. Carturan, G. Maggioni, S.J. Rezvani, R. Gunnella, N. Pinto, M. Gelain, D.R. Napoli.  
*J. Material Chemistry and Physics*, 16, 116-122 (2015).
  - Diffusion Induced effects on geometry of Ge nanowires by MBE  
S. J. Rezvani, F. Celegato, L. Boarino, L. Favre, I. Berbezier, N. Pinto.  
*Nanoscale*, 6, 7469-7473 (2014).
  - Influence of Ti film thickness and oxidation temperature on TiO<sub>2</sub> thin film formation via thermal oxidation of sputtered Ti film  
S. D. Sartale, A.A. Ansari, S.J. Rezvani.  
*Science in Semiconductor Processing* 16, 2005 (2013).
  - Study on TiO<sub>2</sub> thin films prepared by thermal oxidation of dc magnetron sputtered Ti thin films  
S. J. Rezvani, A.A. Ansari, S.D. Sartale.  
*J. DAE Solid state physics*, Vol 54, M02, 139 (2009).
  - Fabrication and characterization of TiO<sub>2</sub>/P-Si heterojunction by thermal oxidation of sputtered Ti films  
A.A. Ansari, S. J. Rezvani, S.D. Sartale.  
*J. DAE Solid state physics*, Vol 54, J40, 963 (2009).

#### Publications under review

- Structure reordering in metal alloying oxide spinel structures upon lithium insertion S. J. Rezvani, Y. Mijiti, R. Gunnella, F. Nobili, M. Minicucci, M. Ciambezi, A. Trapananti and A. Di Cicco.  
*Journal of physics and chemistry of solids*.
- Optical properties of the 25 nm Si<sub>3</sub>N<sub>4</sub> membranes fabricated by wet chemical etching by soft X-ray spectroscopy. S.J. Rezvani, A. Giglia, K. Koshmak, L. pasquali and S. Nannarone.  
*Applied optics*

- Initial lithiation of carbon-coated zinc ferrite anodes studied by in-situ X-ray absorption spectroscopy  
Matteo Giambezi, Marco Minicucci, Stefano Passerini, Francesco Nobili, S. J. Rezvani, Andrea Di Cicco, Angela Trapananti, Roberto Gunnella, Dominic Bresser, Fabio Maroni.

**Radiation Physics and Chemistry.**

- Magnetization of Cu-doped ZnO film structure modulated by Cu<sup>+</sup>/Cu<sup>2+</sup> oxidation state occupancy:  
A possible mechanism for voltage control magnetism.  
Muhammad Younas, Lok Ping Ho, Chi Xu, Mao Wang, Shengqiang Zhou, S. J. Rezvani, Rao Tahir Ali Khan, Muhammad Javed Akhtar, Muhammad Nadeem, Khaqan Shati, Waqar Azeem, Fahad Azad and Francis C. C. Ling  
**Journal of applied physics.**