Mehdi Ansari-Rad

Assistant Professor of Physics, Shahrood University of Technology (2013-Present)
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Research Interest

- Nanophysics:
  Electronic Transport in Disordered Materials
  Dye-Sensitized Solar Cells (DSCs)
  Organic Electronics
- Computational Physics:
  Random processes
  Kinetic Monte-Carlo Simulations
  Material Failure Simulation

Education

- 2009-2013: **Ph.D Physics Solid-State**, University of Tehran, Tehran, Iran
- 2007-2009: **M.Sc Physics Solid-State**, University of Tehran, Tehran, Iran
- 2002-2007: **B.Sc Physics**, University of Tehran, Tehran, Iran

Doctoral Project

- "**Electronic Transport and Recombination in Nanostructured Semiconductors: Investigation for Application in Dye-Sensitized Solar Cells**" 2009-2013
- Supervisor: Prof. Ezatollah Arzi
- Matter: Simulation of Electron Transport in Nanostructured and Energy-Disordered Materials
  Simulation of Charge Recombination in DSCs
  Study of Reaction Order and Ideality Factor in DSCs
  Study of Lifetime Measurement in DSCs
  Growth of TiO_2 nanotubes by anodization method for working electrode in DSC

Graduate Project

- "**The Crack Pattern in Heterogeneous Material**" (2007-2009)
- Supervisor: Dr. Seyed Mehdi Vaez Allaei
- Advisor: Dr. Mohammad Reza Mohammadizadeh
- Matter: Simulation of Quasi-Static Crack Growth in Heterogeneous Mesoscopic Systems

Undergraduate Research Experience

- "**UV-Vis Spectroscopy**" (2007-2008)
- Supervisor: Dr. Mohammad Reza Mohammadizadeh
- Matter: Computing Thin Films Refractive Indices Using UV-Vis Spectroscopy Date

Computer Skills

- Operating System: Windows, Linux (Ubuntu)
- Programming Language: C (C++), Bash Scripting, MATLAB, Python
- Microsoft Office, Latex

Teaching Experience

- Computational Physics
- Advanced Statistical Mechanics
- Thermodynamics and Statistical Mechanics
- Crystallography
- Modern Physics Lab
- General Physics lab (Electricity and Magnetism)
- General Physics (Mechanics)
- General Physics (Electricity and Magnetism)

Awards and Honors

- Membership of the "Scientific Elite Federation" (2015-2017)
- Rank 2 in the entrance exam of University of Tehran for physics Ph.D (2009)
- First Place ranking in the B.Sc and M.Sc physics students in University of Tehran (2007 & 2009)
- Rank 21 in the nationwide entrance exam for physics M.Sc (2007)
- Research Fund Award from Iran's Ministry of Oil (2009)

Visits

- Visiting Researcher: Departament de Física, Universitat Jaume I, Spain, winter & spring 2013.

Publications

- Z. Hadidi, M. Ansari-Rad, S. Hessami Pilehrood, How Molecular Aggregation Affects Internal Quantum Efficiency in Organic Phosphorescent Light-Emitting Diodes, Appl. Phys. Lett. **119**, 233301 (2021).
- M. Ansari-Rad, Transport and Annihilation of the Triplets in Organic Phosphorescent Systems: Kinetic Monte Carlo Simulation and Modeling. J. Phys. Chem. C, **125**, 5760 (2021).
- MA. Bazrafshan, M. Ansari-Rad, S. Hessami Pilehrood, Effect of Energetic Disorder on Triplet-triplet Annihilation in Organic Semiconductors. Phys. Rev. B **101**, 094204 (2020).
- M. Ansari-Rad, J. Bisquert, Insight into Photon Recycling in Perovskite Semiconductors from the Concept of Photon Diffusion. Phys. Rev. Appl. **10**, 034062 (2018).
- M. Ansari-Rad, S. Athanasopoulos, Theoretical Study of Equilibrium and Nonequilibrium Exciton Dynamics in Disordered Semiconductors. Phys. Rev. B **98**, 085204 (2018).
- M. Ansari-Rad, J. Bisquert, Theory of Light Modulated Emission Spectroscopy. J. Phys. Chem. Lett. **8**, 3673 (2017).
- M. Ansari-Rad, Dye Regeneration Kinetics in Dye Sensitized Solar Cell: Long-range Charge Transfer Effects. J. Phys. Chem. C, **120**, 9000 (2016).
- M. Ansari-Rad, G. Garcia-Belmonte, J. Bisquert, Consistent Formulation of the Crossover from Density to Velocity Dependent Recombination in Organic Solar Cells. Appl. Phys. Lett. **107**, 073301 (2015).
- M. J. Fahimi, D. Fathi, M. Ansari-Rad, Accurate Analysis of Electron Transfer from Quantum Dots to Metal Oxides in Quantum Dot Sensitized Solar Cells. Physica E **73**, 148 (2015).
- M. Ansari-Rad, J. A. Anta, E. Arzi, Conditions for Diffusion-Limited and Reaction-Limited Recombination in Nanostructured Solar Cells. J. Chem. Phys. **140**, 134702 (2014).
- M. Ansari-Rad, J. A. Anta, J. Bisquert, Interpretation of Diffusion and Recombination in Nanostructured and Energy-Disordered Materials by Stochastic Quasiequilibrium Simulation. J. Phys. Chem. C **117**, 16275 (Feature Article: Cover of the Issue 32, August 2013).
- M. Ansari-Rad, Y. Abdi, E. Arzi, Monte Carlo Random Walk Simulation of Electron Transport in Dye-Sensitized Nanocrystalline Solar Cells: Influence of Morphology and Trap Distribution. J. Phys. Chem. C **116**, 3212 (2012).
- M. Ansari-Rad, Y. Abdi, E. Arzi, Simulation of Non-linear Recombination of Charge Carriers in Sensitized Nanocrystalline Solar Cells. J. Appl. Phys. **112**, 074319 (2012).
- M. Ansari-Rad, Y. Abdi, E. Arzi, Reaction Order and Ideality Factor in Dye-Sensitized Nanocrystalline Solar Cells: a Theoretical Investigation. J. Phys. Chem. C **116**, 10867 (2012).
- M. Ansari-Rad, S. M. Vaez Allaei, M. Sahimi, Non-Universality of Roughness Exponent of Quasi-Static Fracture Surfaces. Phys. Rev. E **85**, 021121 (2012).