

IN THE NAME OF GOD



*School of Physics* Bu-Ali Sina University

**Ghassem Ansaripour**

Associate Professor

Department of Physics

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**PERSONAL INFORMATION**

Nationality: Iranian

Marital status: Married

Department: Physics

Group: Condensed Matter

Academic Position: Associate Professor

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**ACADEMIC DEGREES**

Ph.D.: Condensed Matter Physics, 1994-1999, Warwick University, Coventry, CV4  
7AL, United Kingdom

M.Sc.: Applied Solid State Physics, 1984-1986, Isfahan University, Iran

B.Sc.: Physics, 1982, Isfahan University, Iran

## **THESIS TITLE**

Ph.D. Thesis: Hot Carriers and High Field Effects in Si/SiGe Heterostructures

M.Sc. Thesis: Hot Electrons in Semiconductors

## **PROMOTION**

Associate professor          Physics          2010-present

Assistant professor          Physics          1999-2010

## **COURSES**

Many Particle Physics

A Quantum Approach to Condensed Matter Physics

Advanced Solid State Physics

Nanoelectronics

The Theory and Technology of Semiconductor Devices

Advanced Statistical Mechanics

Modern Physics

## **ACADEMIC RESPONSIBILITIES, HONOURS AWARD**

Head of the Solid State Group of Physics Department of Yazd University 2010-2014

Member of the Scientific Committee of Academic Staff Employment of Physics Department 2009-2014

Distinguished professor's award 2009

Head of the Faculty of Science Library of Yazd University 2005-2008

Member of the Scientific Committee of the 6<sup>th</sup> Conference on Condensed Matter, Yazd 2003

Member of the Organizing Committee of the 6<sup>th</sup> Conference on Condensed Matter, Yazd 2003

Member of the Promotion Committee of Science Faculty of Yazd University 2000-2004

Head of the Physics Department of Yazd University 2000-2002

## CURRENT RESEARCH INTERESTS

- Simulation and calculation of  
Electrical and thermal properties of quantum devices (such as nanowires, nanotubes, graphene mono/bilayer), field dependent/independent and low /high temperature carrier mobility, carrier transport and velocity-field characteristics, charge transfer, surface states, scatterings, transport parameters, energy loss rate, metal insulator transition, real space transfer, conductivity in quantum wells, nano/sub-micron transistors/MOSFETs and nano heterostructures
- Low temperature electrical and magnetic properties of two dimensional carrier gas
- Short channel effects in transistors
- Carbon nanotube field effect transistor
- Drain current in short channel double gate MOSFETs
- First principle study of the effect of strain and atomic doping on the transport properties of AWCNT

## SELECTED PUBLICATIONS

- **Ansaripour Ghassem**, "The Carrier effective mobility of a graphene nanoribbon field effect transistor", (submitted).
- **Ansaripour Ghassem**, Shayeghy Bahareh, "Quantum screening of one dimensional electron gas of ZnO and InAs nanowires in dielectric environment", *J. Research of Many Body Particle Systems*, **11** (2016) 1-6.
- **Ansaripour Ghassem**, Shayeghy Bahareh, "The effect of dielectric environment on the carrier transport in semiconducting nanowires", *Int. J. for Light and Electron Optics*, **127**, (2016) 9673-9678.
- **Ansaripour Ghassem**, Bagheri Zahra, "Investigation of thermal properties of polycrystalline graphene", *Al-Zahra Univ. J. Appl. Phys.* **2** (2015) 23-39.

- **Ansaripour Ghassem**, "Two dimensional analytical threshold voltage modelling of pseudomorphic SiGe p-channel MOSFETs", *Acta Physica Polonica A* **120** 6 (2011) 1043-1046.
- **Ansaripour Ghassem**, "Calculation of surface potential and sub-threshold current in short channel MOSFETs", *J. Research of Many Body Particle Systems*, **1**, (2011) 1-8.
- **Ansaripour Ghassem**, "The calculation of eigenfunctions in a double-well oscillator", *Physica Scripta* **82** (2010) 045008.
- **Ansaripour Ghassem**, "Mobility of holes in a Si/SiGe metal oxide semiconductor field effect transistor", *Thin Solid Films* **518** 19 (2010) 6105-6108.
- **Ansaripour Ghassem**, "The effect of hot phonons on the hole drift velocity in a p-type Si/SiGe modulation doped heterostructure", *Thin Solid Films* **517** 21 (2009) 5559-5603.
- **Ansaripour G.**, "The quantum mechanical anharmonic oscillator", *Int. J. Pure Appl. Phys.* **4** 3 (2008) 223-228.
- **Ansaripour G.**, "High field hole transport in SiGe MOSFETs", *Recent Res. Devel. Sci. Tech. Semiconductors*, **1** (2002) 51-63.
- **Ansaripour G.**, Braithwaite G., Myronov M., Mironov O. A., Parker E. H. C., Whall T. E., "Energy loss rates of two-dimensional hole gases in inverted Si/SiGe heterostructures", *Appl. Phys. Lett.*, Vol. **76**, No. 9, (2000) 1140-1142.
- **Ansaripour, G.**, Braithwaite, G., Parker, E. H. C., Whall, T. E., "Study of velocity field characteristics in pseudomorphic SiGe p-channel metal-oxide semiconductor field effect transistor", *Microelectron. Engin.* **51-52** (2000) 541-546.
- Kaya S., Zhao Y-P, Watling J. R., Asenov A., Barker J. R., **Ansaripour G.**,

Braithwaite G., Whall T. E., Parker E. H. C., "Indication of velocity overshoot in strained SiGe p-channel MOSFETs", *Semicond. Sci. Technol.*, **5** (2000) 573-578.

#### SELECTED PAPERS PRESENTED IN THE INTERNATIONAL CONFERENCES

- **Ansaripour G.**, Bahrami Moghaddas M., "The Effect of Charged Impurities on the Conductivity in a Single-Layer Graphene", 7<sup>th</sup> International Conference on Nanostructures (ICNS7) Sharif University of Technology, (2018) Tehran Iran.
  - **Ansaripour G.**, Emadi Azami S., "The Thermal Conduction of Phonons in a Semiconductor Nanowire", 7<sup>th</sup> International Conference on Nanostructures (ICNS7) Sharif University of Technology, (2018) Tehran Iran.
  - **Ansaripour G.**, Shayeghy B., "The carrier Mobility of Semiconducting Nanowires", 6<sup>th</sup> International Conference on Nanostructures (ICNS6) Sharif University of Technology (International Campus), (2016) Kish Island Iran.
  - **Ansaripour Ghassem**, Gholamrezaei Sahebe, "On the current-density electric field characteristics in carbon nanotubes," Extended Abstract, Jan. (2015) Turkey.
  - Dehghani K., Kazempoor A., **Ansaripour G.**, 4<sup>th</sup> International Conference on Nanostructures (ICNS4) pp 176, Sharif University of Technology (International Campus), (2012) Kish Island, Iran.
- Ansaripour Ghassem**, On the 18<sup>th</sup> International on Vacuum Congress, "Carrier transport characteristics in a Si/SiGe nano heterostructure field effect transistor," Extended Abstract, Beijing, Aug. 23 (2010) China.
- Sadeghzadeh M. A., **Ansaripour G.** and Eitesami M., "The role of the non-abruptness of Ge profile on the effective mass of holes confined in the Si/SiGe/Si quantum well," Proceeding of the International Conference on Physics Amikabir University of Technology, (2004) Iran, pp. 569-575.

- **Ansaripour G.**, Braithwaite G., Parker E. H. P., Whall T. E., Kaya S., Zhao Y., Asenov A., "Hole high field transport properties in pseudomorphic SiGe p-channel Metal Oxide Semiconductor Field Effect Transistors," Extended abstract of the 8<sup>th</sup> European Heterostructure Technology (HETEh), Cardiff Univ., Wales, (1998) UK.
- **Ansaripour, G.**, Braithwaite, G., Mironov, O. A., Parker, E. H. C., Whall, T. E., "Energy loss rates of two-dimensional hole gases in gated inverted Si/SiGe heterostructures", presented in the "Lattice Mismatch Thin Films Conference," Sep. (1998) Italy.
- **Ansaripour G.** and Agan S., "Two dimensional analytical threshold voltage modelling of pseudomorphic SiGe pMOSFETs", Physics Conference in Kirikkale University", 20-22 May (1998) pp. 351-357.
- **Ansaripour G.**, Lander R. J. P., Parker E. H. C., Whall T. E., Kaya S., Zhao Y-P, Watling J. R., Asenov A., Barker J. R., "Hole velocity field characteristics in SiGe pMOS," Proceeding of the CMMP Exeter Univ., (1997) UK, pp. 137.
- **Ansaripour G.**, Matthey N. L., Phillips P. J., Parker E. H. C., Whall T. E., "Velocity saturation and negative differential resistance in remote doped p-type Si/SiGe heterostructures," Proceeding of the CMMP, York Univ., (1996) UK, pp. 115.
- **Ansaripour G.**, Braithwaite G., Leadley D., Parker E. H. C., Whall T. E., "Negative differential resistance in remote doped p-type Si/SiGe heterostructures," Proceeding of the Condensed Matter and Material Physics , Liverpool Univ.. (1995) UK, pp. 136.

#### SELECTED PAPERS PRESENTED IN THE NATIONAL SEMINARS

- **Ansaripour G.**, Mohammadi A.A., "The Effect of Dielectric Environment On the Two Dimensional Electron Gas in an Si Inversion Layer", Proceeding of the 5<sup>th</sup> Iran's Crystal Growth Conference pp. (2018, Malek Ashtar University of Shahin Shahr, Isfahan, Iran).

- **Ansaripour G.**, Bahrami Moghaddas M., "Static polarization function and screening effect in graphene monolayer," Proceeding of the Annual Condensed Matter Physics Conference pp. (Jan. 2017, Kharazmi University, Iran).

- **Ansaripour G.**, Bagheri Z., "The effect of size grains on the thermal conductivity of polycrystalline graphene," Proceeding of the 4<sup>th</sup> Iran's Crystal Growth Conference pp. (2016, University of Malayer, Iran).

- **Ansaripour G.**, Shayeghy B., "Study of screening electron gas in the GaAs nanowire with dielectric environment," Proceeding of the Second National Conference Workshop Nanotechnology (NCWNN1394) pp. (May 2015, Kharazmi University, Iran).

- **Ansaripour G.**, Shahrestani H., "Calculating of Potential and Current-Voltage Along the Channel of a Graphene Nanoribbon Field-Effect Transistor," Proceeding of the 12<sup>th</sup> Annual Condensed Matter Physics Conference pp. 1220-1223 (Jan. 2015, Isfahan University of Technology, Iran).

Gholamrezaei S., **Ansaripour G.**, 4<sup>th</sup> National Conference on Chemical applications in Modern Technology, "Study of negative differential conductivity in nanotubes," pp. (Jan. 2015, Isfahan, Iran)

- Dabiri Z., **Ansaripour G.**, "The effect of Line Edge Roughness Scattering on Semiconducting Graphene Nano-Ribbons conductivity", Proceeding of the Annual Physics Conference pp. 1192-1195 Sep. 2014, Sistan University, Iran.

- Ghasemian E., **Ansaripour G.**, "Detection of bio and chemical molecule using carbon nanotube field effect transistors," 9<sup>th</sup> Electro-Chemical Conference pp. 132 (Jan. 2011, Yazd University, Iran).

- Ghasemian E., **Ansaripour G.**, "Performance improvement of carbon nanotube field effect transistors using ultrasonic nanowelding technology," 1<sup>st</sup> National Conference on Nanoscience & Nanotechnology, pp. 3151-3154 (Feb. 2011,

Payam Noor University of Yazd, Iran).

- Ghasemian E., **Ansaripour G.**, Proceeding of the Annual Physics Conference pp (Sep. 2011, Urmia University, Iran).

- Ghasemian E., **Ansaripour G.**, Study of current-voltage characteristics of carbon nanotube transistor," Proceeding of the Annual Physics Conference pp. 1777-1780 (Sep. 2011, Yazd University, Iran).

- **Ansaripour G.**, Rasouli M., Proceeding of the Annual Physics Conference pp (Sep. 2011, Urmia University, Iran).

- **Ansaripour G.**, Rasouli M., Study of electron-phonon interaction and mobility of two dimensional electron gas in moderate field and low temperature," Proceeding of the Annual Physics Conference pp. 1773-1776 (Sep. 2011, Yazd University, Iran).

- Ghasemian E., **Ansaripour G.**, Modelling of carbon nanotube photovoltaic solar cell," Proceeding of the Annual Physics Conference pp (Sep. 2011, Urmia University, Iran).

- Rasouli M., **Ansaripour G.**, Study of field dependent mobility of a two dimensional electron gas regarding intravalley acoustic phonon interaction," Proceeding of the Annual Physics Conference pp 2307-2310 (Aug. 2010, Bu Ali Sina University, Iran).

- **Ansaripour G.**, Mehrabipour E., "Negative differential resistance in GaAs/AlGaAs heterostructure", Proceeding of the Annual Physics Conference pp. 1208-1211 (Aug. 2009, Isfahan University of Technology, Iran).

- **Ansaripour G.**, Fathipour M., Fathi M., "Carrier transport in a nano MOSFETs", Proceeding of the Annual Physics Conference pp. 1200-1203 (Aug. 2009, Isfahan University of Technology, Iran).

- **Ansaripour G.**, Rafie H., "Valence bands calculations of silicon and germanium including non parabolicity and anisotropy", Proceeding of the Annual Physics



Conference pp. 1204-1207 (Aug. 2009, Isfahan University of Technology, Iran).

- **Ansaripour G.**, Fazel E. S., "Velocity overshoot effect in submicron MOSFETs", Proceeding of the 9<sup>th</sup> Condensed Matter Conference pp. 750-752 (Feb. 2008, Ahvaz University, Iran).

- **Ansaripour G.**, Investigation of piezoelectric coefficient in the SiGe heterostructure," Proceeding of the 16<sup>th</sup> Annual Crystallography and Mineralogy Seminar pp. (2008, University of Rasht, Iran).

- Yousofi M. H., Khosravi A. A., **Ansaripour G.** Sadeghzadeh M. A., Jannesari M., Khani O., Investigation of structural properties of CdS:Ni nanocrystals synthesizes with wet chemical method," Proceeding of the 8<sup>th</sup> Condensed Matter Conference pp. 515-518 (Feb. 2007, Mashad University, Iran).

- Yousofi M. H., Khosravi A. A., **Ansaripour G.** Sadeghzadeh M. A., Jannesari M., Khani O., Production and investigation of optical properties of CdS:Ni nanocrystals synthesizes with halter chemical method," Proceeding of the 13<sup>th</sup> Annual Iranian Conference on Optics and Photonics pp. 797-799 (Feb. 2007, Iran).

- **Ansaripour G.** and Hedayatifar L., "Energy relaxation rate in GaAs/AlGaAs heterostructure," Proceeding of the 8<sup>th</sup> Condensed Matter Conference pp 452-455 (Feb. 2007, Mashad University, Iran).

- **Ansaripour G.** and Aghamohammadrafie M., "Comparison of the effects of hot phonon on the drift velocity of two dimensional electron gas in GaAs and GaN," Proceeding of the Annual Physics Conference pp 377-380 (Aug. 2006, Shahrood University, Iran).

- **Ansaripour G.** and Rafieiyan S., "Study of electron scattering mechanisms in AlGaAs/GaAs Multilayer structure," Proceeding of the 7<sup>th</sup> Condensed Matter Conference pp. 197-199 (Jan. 2005, Tehran, University of Science and Technology, Iran).

- **Ansaripour G.** and Sadeghzadeh M. A., "Study of hot holes transport at very low

temperatures in the gated Si/SiGe heterostructures," Proceeding of the 7<sup>th</sup> Condensed Matter Conference pp. 200 (Jan. 2005, Tehran, University of Science and Technology, Iran).

- Sadeghzadeh M. A. and **Ansaripour G**, "Negative magnetoresistance study of two dimensional hole gas in the p-Si/SiGe/Si gated structures," Proceeding of the 7<sup>th</sup> Condensed Matter Conference pp. 222-224 (Jan. 2005, Tehran, University of Science and Technology, Iran).

- Masoumniayefard M. B., Sadeghzadeh M. A., **Ansaripour G**. and Salehi M., A., "Theoretical study of formation and charge transfer of two dimensional electron gases in the gated AlGaAs/GaAs/AlGaAs structures," Proceeding of the 7<sup>th</sup> Condensed Matter Conference pp. 234-236 (Jan. 2005, Tehran, University of Science and Technology, Iran).

- Sadeghzadeh M. A., **Ansaripour G**. and Eitesami M., "Characterization of Si/SiGe/Si heterostructures by X-ray and electrical method," Proceeding of 11<sup>th</sup> Conference of Crystallography and Mineralogy of Iran pp. 429-433 (Feb. 2004, Yazd University, Iran).

- **Ansaripour G**. and Mousavi S. S., "Study of hole mobility due to interface charge density in the Si/SiGe/Si structure," Proceeding of the Annual Physics Conference pp. 132-133 (Aug. 2003, Tabriz, Azerbaijan University of Tarbiat Moallem, Iran).

- Mousavi S. S., and **Ansaripour G**. "Study of modulation doped Si/SiGe/Si heterostructures," Proceeding of the 9th Annual Conference of Iran Physics Education pp. 22 (Sep. 2003, Isfahan, Teaching and Training Organization of Isfahan Province, Iran).

- **Ansaripour G**. and Sadeghzadeh M. A., "Study of hole velocity saturation in Si/SiGe pMOSFETs," Proceeding of the Annual Physics Conference pp. 127-129 (Aug. 2003, Tabriz, Azerbaijan University of Tarbiat Moallem, Iran).

- Sadeghzadeh M. A. and **Ansaripour G**., Temperature dependence of electrical

conductivity of 2DHG in p-Si/SiGe/Si structures," Proceeding of the Annual Physics Conference pp 233-234 (Aug. 2003, Tabriz, Azerbaijan University of Tarbiat Moallem, Iran).

- Sadeghzadeh M. A. and **Ansaripour G.**, Scattering of holes in Si/SiGe/Si quantum well," Proceeding of the 6<sup>th</sup> Condensed Matter Conference pp 9-11 (Feb. 2003, Yazd University, Iran).

- **Ansaripour G.** and Sadeghzadeh M. A., Study of p type Si/SiGe MOSFET using CV measurement," Proceeding of the 6<sup>th</sup> Condensed Matter Conference pp 72-73 (Feb. 2003, Yazd University, Iran).

- **Ansaripour G.** and Mousavi S. S., "Study of hole mobility due to interface charge density in the Si/SiGe/Si structure," Proceeding of the Annual Physics Conference pp. 132-134 (Aug. 2003, Tabriz, Azarbaijan University of Tarbiat Moallem, Iran).

- Sadeghzadeh M. A. and **Ansaripour G.**, Proceeding of the Annual Physics Conference pp 111-113 (Aug. 2002, University of Zanjan, Iran).

- **Ansaripour G.** and Sadeghzadeh M. A., Proceeding of the Annual Physics Conference pp. 287-288 (Aug. 2002, University of Zanjan, Iran).

- Sadeghzadeh M. A. and **Ansaripour G.**, Proceeding of the Annual Physics Conference pp 78-79 (Aug. 2001, University of Sabzevar, Iran).

- **Ansaripour G.** and Sadeghzadeh M. A., Proceeding of the Annual Physics Conference pp. 76-77 (Aug. 2001, University of Sabzevar, Iran).

- **Ansaripour G.**, Study of velocity-field characteristics in p type SiGe field effect transistors," Proceeding of the 5<sup>th</sup> Annual Physics Conference pp. 92-93 (Aug. 2000, University of Shahroud, Iran).

## **SUPERVISED POASTGRADUATE STUDENTS**

M. Bahrami Moghaddas," Study of the electrical conductivity limited by charged-impurity scattering in monolayer graphene" 2017.

S. Emadi Azami,"The thermal conductivity of carriers in one dimensional systems" 2017.

Zohreh Dabiri "Anharmonic effects in semiconducting structures" 2016.

Bahareh Shayeghy "Investigation of quantum screening of one dimensional electron gas in dielectric environment" 2015.

Hosein Shahrestani "Study of graphene nanoribbon field effect transistor" 2015.

Sahebe Gholamrezaei "Study of negative differential conductivity in carbon nanotube" 2015.

Zahra Bagheri "Investigation of thermal properties of polycrystalline graphene" 2015

B. Bagheri "Calculation and comparison of transport and quantum relaxation times of scattering mechanisms in two dimensional electron gas" 2013.

R. Kadivar "Study of electron transport in carbon nanotube" 2013.

S. Dashti "Study of drain current in short channel double gate MOSFETs" 2012.

K. Dehghani "First principle study of the effect of strain and atomic doping on the transport properties of AWCNT" 2012.

M. Shirmohamadali "Structural, electronic and magnetic properties of UAs/Ge" 2012.

A. H. Movahedi "Fabrication of carbon nanotube based electrodes for using in super-capacitors" 2012.

E. Ghasemian "Study of carbon nanotube field effect transistor" 2011.

H. Khademi "Study of charge accumulation in InGaN/GaN Quantum well and internal electric field" 2011.

S. Pirzad "Simulation of crystal defects in Gallium Nitride and Study of its electrical and optical effects" 2011.

S. M. Azizi Sani "Theoretical investigation of alloy scattering in remote doped heterostructures Si/SiGe/Si and AlGaAs/GaAs/AlGaAs" 2010.

M. Rasouli "Study of field dependent mobility characteristics of a two-dimensional electron gas in interaction with intra-valley acoustic phonons" 2010.

M. R. Karimi "Study of conductivity in two dimensional systems" 2010.

E. S. Fazel "Study of short channel effects in transistors" 2009.

H. Rafie "Determination of valance band of Si and Ge including non-parabolicity with analytical method" 2009.

S. Ravankhah "Synthetic of  $\text{Co}_{0.5}\text{Zn}_{0.5}\text{Fe}_2\text{O}_4$  nanostructure coating of produced nano-particles and study of their magnetic properties" 2009.

M. Fathi "Carrier transport characteristics of field effect nano-transistors" 2009.

M Jannesari, "Synthesis and investigation of optical and magnetic properties of Ni doped CdS semiconductor nano-particles and study of its industrial applications" 2007.

L. Gharibshahi "Determination of Ti/Si interface charge density in the inverted gated p-Si/SiGe/Si/Ti heterostructures" 2007.

A. Rahmani "Study of metal insulator transition in GaAs/AlGaAs heterostructures" 2007.

E. Mehrabipour "Study of real space transfer of electrons in quantum wells and its application in AlGaAs heterostructure" 2007.

E. Abolhasani Darani "Theoretical study of parallel conduction" 2007.

M. Aghamohammadrafie, "Study of velocity-field characteristics in MOS transistor" 2006.

M. Fakharpour, "Theoretical study of the surface states in the p-Si/SiGe/Si remote doped structures" 2006.

M. Gharekhani, "Theoretical investigation of Coulomb scattering in remote doped two dimensional electron and hole systems" 2006.

M. Abdolhosseinizadeh, "Determination of transport parameters of two dimensional hole gas at low temperatures in p-Si/SiGe/Si heterostructures" 2006.

L. Hedayatifar, "Study of energy loss of carriers in quantum wells and its application in SiGe 2006.

R. Amraei, "Far Infrared Spectroscopy of  $\text{In}_x\text{Ga}_{1-x}\text{N}/\text{GaN}$  doped Multi Quantum Well" 2005.

M. B. Masoumniaefard, "Theoretical study of charge transfer in the remote-doped AlGaAs/GaAs and Si/SiGe heterostructures" 2004.

S. Rafieiyan, "Study of electron mobility in GaAs/AlGaAs quantum well" 2004.

S. S. Mousavi, "Study of two dimensional hole gas, using modulation doped technique" 2003.