

## Curriculum vitae

Dr. Omer DONMEZ

## Contact information

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## Degrees

2009-2013 PhD. Physics, Istanbul University, Istanbul, Turkey

Thesis Entitled “An investigation of low semiconductor structures by modulation spectroscopy”  
[Supervised by Prof. M. Çetin Arıkan]

2006-2009 MSc. Physics, Istanbul University, Istanbul, Turkey;

Thesis Entitled “An investigation of semiconductor quantum well structures with modulation spectroscopy” [Supervised by Prof. M. Çetin Arıkan]

2000-2004 BSc. Physics, Istanbul University, Istanbul, Turkey

Thesis Entitled “Solution of Einstein’s gravitational field equations under Reissner-Nordstrom approximation” [Supervised by Prof. Şehsuvar Zebitay]

## Employment

2017 – Associate Professor, Department of Physics, Istanbul University

2014 –2017- Assistant Professor, Department of Physics, Istanbul University

2010 – 2014 Research Assistant, Department of Physics, Istanbul University

## Awards

2006-2008 The scientific and technological research council of Turkey

2002-2004 Zorlu Company Scholarship

## Computer skills

MS Office programs, Matlab Pro 2013b, LabVIEW Pro, Origin Pro, NI Circuit Design Pro.

## Research Areas

Low dimensional semiconductors, nanostructures based on III-V compounds, electronic and magneto-transport properties in III-V low dimensional semiconductors, design and optical characterization (PR, CER, PL, PV/PC) of optoelectronic devices.

## Research Projects

Influence of bismuth concentration on electronic transport properties in dilute bismide modulation doped GaAsBi/GaAs quantum well structures (Director), TUBITAK, Project Grant: 170k€ 2016

GaInP/GaAs/n-i-p-i GaInNAs tandem solar cells for 21st century (Researcher), TUBITAK, Project Grant: 120 k€ 2016

Optical characterization GaBiAs/GaAs alloys at room temperature (Director), Istanbul University Research Project, No:44649, 2014-2015

An investigation of optical and electrical transport properties of n- and p-type modulation doped  $\text{Ga}_{1-x}\text{In}_x\text{N}_y\text{As}_{1-y}/\text{GaAs}$  quantum well structures, The scientific and technological research council of Turkey (TUBITAK), No: 110T874, Researcher, 2010-2013

Novel gain materials and devices based on III-V-N compounds, COST MP0805 (Researcher), 2009-2013

Advanced lithographic laboratory, State Plan Organization, No: 2010K121050 (Researcher), 2010-2013

Investigation of low dimensional semiconductor structures by modulation spectroscopy (Director), Istanbul University Research Project, No: 27643, 2012-2013

An investigation of semiconductor quantum well structures with modulation spectroscopy (Director), Istanbul University Research Project, No: T-957, 2006-2008

## Visiting Positions

September –2011 Laboratory for optical spectroscopy of nanostructures, Institute of Physics, Wroclaw University of Technology, Wroclaw, Poland [Research]

## Publications

### SCI Papers

Ç. Cetinkaya, S. Mutlu, Ömer Dönmez, A. Erol, “Superlattices and Microstructures Characterization of emitted light from travelling Gunn domains in  $\text{Al}_{0.08}\text{Ga}_{0.92}\text{As}$  alloy based Gunn devices”, Superlatt. and Microstruct. 111, 744 (2017)

Ferhat Nutku, Ömer Dönmez, Erman Cokduygulular, Fahrettin Sarcan, Furkan Kuruoglu, Selman Mutlu, Saffettin Yildirim and Ayse Erol, “Effect of thermal annealing on quantum transport in disordered dilute nitride based modulation doped quantum well structures”, J. Alloy Compd. 695, 404 (2017)

Ömer Dönmez, K Kara, A Erol, E Akalin, H Makhloufi, A Arnoult and C Fontaine, Thermal annealing effects on optical and structural properties of GaBiAs epilayers: Origin of the thermal annealing-induced redshift in GaBiAs, J. Alloy Compd. 686, 976 (2016)

Sarcan F., Nutku F., Dönmez Ö., Kuruoğlu F., Mutlu S., Erol A., et al., "Quantum oscillations and interference effects in strained N- and p-type modulation doped GaInNAs/GaAs quantum wells", J. Phys. D: Appl. Phys., 48, pp.305108-305116, 2015

F. Nutku, O. Donmez, F. Sarcan, A. Erol, J. Puustinen, M. C. Arikan and M. Guina, “Negative and positive magnetoresistance in GaInNAs/GaAs modulation doped quantum well structures”, Appl. Phys. A Mater. Sci. Process, 2015

- Dönmez Ö., Erol A., Arikan M.C., Makhloufi H., Arnoult A., Fontaine C., "Optical properties of GaAsBi single quantum well structures grown by MBE", *Semicond. Sci. Technol.*, 30, 094016- 094016, 2015
- O. Donmez, F. Sarcan, M.P. Vaughan, A. Erol, M.Gunes, M. C. Arikan, J. Puustinen, M. Guina, Analytic modeling of temperature dependence of 2D carrier mobility in as-grown and annealed GaInNAs/GaAs quantum well structures, *Semicond. Sci. Technol.*, 29, 125009, 2014
- C. A. Broderick, S. Mazzucato, H. Carrere, T. Amand, H. Makhloufi, A. Arnoult, C. Fontaine, O. Donmez, A. Erol, M. Usman, E. P. O'Reilly, and X. Marie, Anisotropic electron g factor as a probe of the electronic structure of GaBi<sub>x</sub>As<sub>1-x</sub>/GaAs epilayers, *Phys. Rev. B*, 90, 195301, 2014
- O. Donmez, F. Sarcan, A. Erol, M. Gunes, M.C. Arikan, J. Puustinen, M. Guina, "Magnetotransport study on as-grown and annealed n- and p-type modulation-doped GaInNAs/GaAs strained quantum well structures", *Nanoscale Res. Lett.*, 9, 141, 2014
- F. Sarcan, Donmez O., K. Kara, A. Erol, E. Akalin, M. C Arikan, H. Makhloufi, A. Arnoult, C. Fontaine, "Bismuth-induced effects on optical, lattice vibrational, and structural properties of bulk GaAsBi alloys", *Nanoscale Res. Lett.*, 9, 119, 2014
- F. Sarcan, O. Donmez, A. Erol, M. Gunes, M. C. Arikan, J. Puustinen, M. Guina, "Influence Of Nitrogen On Hole Effective Mass and Hole Mobility in p-Type Modulation Doped GaInNAs/GaAs Quantum Well Structures", *Appl. Phys. Lett.*, 103, 082121, 2013
- F. Sarcan, O. Donmez, M. Gunes, A. Erol, M. C. Arikan, J. Puustinen, M. Guina, "An Analysis Of Hall Mobility In As-Grown And Annealed n- and p-Type Modulation-Doped GaInNas/GaAs Quantum Wells", *Nanoscale Res. Lett.*, 7, 529, 2012
- O. Donmez, F. Nutku, A. Erol, M.C. Arikan, Y. Ergun, "A Study of Photomodulated Reflectance on Staircase-Like, n-Doped GaAs/Al<sub>x</sub>Ga<sub>1-x</sub>As Quantum Well Structures", *Nanoscale Res. Lett.*, 7, 622, 2012.
- A. Erol, E. Akalin, F. Sarcan, O. Donmez, S. Akyuz, M.C. Arikan, J. Puustinen, M. Guina, "Excitation Energy-Dependent Nature of Raman Scattering Spectrum in GaInNAs/GaAs Quantum Well Structures", *Nanoscale Res. Lett.*, 7, 656, 2012.
- O. Donmez, M. Gunes, A. Erol, M.C. Arikan, N. Balkan, W. Schaff, "The Role of Dislocation-Induced Scattering in Electronic Transport in GaxIn<sub>1-x</sub>N Alloys", The role of dislocation-induced scattering in electronic transport in GaxIn<sub>1-x</sub>N alloys, *Nanoscale Res. Lett.*, 7, 490, 2012
- O. Donmez, A. Erol, M. Gunes, M.C. Arikan, N. Balkan, "High Carrier Concentration Induced Effects on The Bowing Parameter and the Temperature Dependence of the Band Gap of GaxIn<sub>1-x</sub>N ", *J. Appl. Phys.*, 110, 103506, 2011
- O. Donmez, M. Yilmaz, A. Erol, B. Ulug, A. Ulug, M.C. Arikan, A. O. Ajagunna, E. Iliopoulos, A. Georgakilas, "Influence of High Electron Concentration on Band Gap and Effective Electron Mass of InN", *Phys. Stat. Solidi (B)*, 248, 1172, 2011
- H. Basak, A. Erol, O. Donmez, M. C. Arikan and M. Saarinen, The effects of quantum well numbers and thermal annealing on optical properties of GaInNAs/GaAs quantum well structures, *Phys. Stat. Sol. (C)* 8 1641–1645 (2011)

### Conference Papers

- T. Eruçar, K. Kara, Ömer Dönmez, A. Erol, A. Arnault, C. Fontaine, "Influence of chemical process on structural and optical properties of as-grown and thermally annealed GaAsBi alloy", International Workshop on Bismuth Containing Semiconductors, 23-26 Temmuz 2017, Marburg, Almanya, Poster

- A. Muhammetgulyyev, F. Sarcan, B. Kınacı, Ömer Dönmez, A. Erol, “Characterisation of heterojunction pin solar cells based on dilute bismide and dilute nitride”, International Workshop on Bismuth Containing Semiconductors, 23-26 Temmuz 2017, Marburg, Almanya, Poster
3. C. Çetinkaya, E. Çokduygulular, F. Nutku, Ömer Dönmez, J. Puustinen, A. Erol, M. Guina, “Optical characterization of n-and p-type modulation doped GaAsBi/GaAs quantum wells”, International Workshop on Bismuth Containing Semiconductors, 23-26 Temmuz 2017, Marburg, Almanya, Poster
- Ç. Cetinkaya, S. Mutlu, Ömer Dönmez, A. Erol, “Light emission from Al<sub>0.08</sub>Ga<sub>0.92</sub>As GUNN device”, Nanophotonics and Micro/Nano Optics International Conference, 7-9 Aralık 2016, Paris-Fransa, Poster
- Ç. Cetinkaya, S. Mutlu, Ömer Dönmez, A. Erol, Stimulated light emission from GUNN Domains in Fabry Pérot Al<sub>0.08</sub>Ga<sub>0.92</sub>As gunn device, TPS 32. International Physics Congress, 6-9 Eylül 2016, Bodrum, Türkiye, Sözlü
- F. Nutku, Ömer Dönmez, E. çokduygulular, F. Sarcan, F. Kuruoğlu, S. Mutlu, S. Yıldırım and A. Erol, Investigation of electronic transport properties in GaInNAs/GaAs quantum well structures, TPS 32. International Physics Congress, 6-9 Eylül 2016, Bodrum, Türkiye, Sözlü
- T. Eruçar, F. Nutku, Ömer Dönmez, A. Erol, Electronic bandstructure of semiconductor dilute bismide structures, TPS 32. International Physics Congress, 6-9 Eylül 2016, Bodrum, Türkiye, Sözlü
- Tulin Erucar , Ömer Dönmez, Kamuran Kara, Furkan Kuruoglu, Ayse Erol, Structural and optical investigation of annealing effects on GaBiAs alloys, TPS 32. International Physics Congress, 6-9 Eylül 2016, Bodrum, Türkiye, Sözlü
- S.Mutlu, E. Çokduygulular, Ç.Çetinkaya, F. Sarcan, Ö. Dönmez and A.Erol, Electronic transport properties of p-type gainnas/gaasquantum well structures, TPS 32. International Physics Congress, 6-9 Eylül 2016, Bodrum, Türkiye, Poster
- Ömer Dönmez, K. Kara, A. Erol, H. Makhloufi, A. Arnoult, C. Fontaine, “Optical and structural properties of as-grown and annealed GaAsBi epilayers”, 9th International Physics Conference of the Balkan Physical Union-BPU9, 24-27 Ağustos 2015, İstanbul, Türkiye, sözlü
- F. Nutku, F. Sarcan, Ömer Dönmez, F. Kuruoğlu, S.Mutlu, A. Erol, S.Yıldırım, M.C. Arıkan, “Temperature and electric field dependence of localization in modulation doped GaInNAs/GaAs quantum well structures”, 9th International Physics Conference of the Balkan Physical Union-BPU9, 24-27 Ağustos 2015, İstanbul, Türkiye, sözlü
- C. Cetinkaya, S. Mutlu, Ömer Dönmez, A. Erol, N. Balkan, M. C. Arıkan, “Investigation of Light Emission Based on Gunn Effect in n – type GaAs”, 9th International Physics Conference of the Balkan Physical Union-BPU9, 24-27 Ağustos 2015, İstanbul, Türkiye, poster
- O. Donmez, M. Aslan, A. Erol, M. C. Arıkan, B. Lewis, V. Bahrami Yekta, T. Tiedje, H. Makhloufi, A. Arnoult and C. Fontaine, 5th International workshop on Bismuth-containing semiconductors, 20-23 July 2014, Cork, Ireland
- O. Donmez, F. Sarcan, M.P. Vaughan, A. Erol, M.Gunes, M. C. Arıkan, J. Puustinen, M. Guina, Analytic modeling of temperature dependence of 2D carrier mobility in as-grown and annealed GaInNAs/GaAs quantum well structures, TPS 31. International Physics Congress, 21-24 July 2014, Bodrum, Turkey
- F. Nutku, O. Donmez, F. Sarcan, A. Erol and M. C. Arıkan, Magnetoresistance in n-and p-type GaInNAs-GaAs modulation doped quantum well structures, TPS 31. International Physics Congress, 21-24 July 2014, Bodrum, Turkey
- O. Donmez, F. Sarcan, A. Erol, M. Gunes, M. C. Arıkan, J. Puusitinen, and M. Guina, Thermal annealing- and Nitrogen-induced effects on electronic transport in n-and p-type modulation doped GaInNAs/GaAs quantum well structures, Novel Gain Materials and Devices Based on III-V-N/Bi Compounds, 24-26 September, 2013, Istanbul, Turkey

- O. Donmez, A. Erol, E. Akalin, M. C. Arıkan, C. Fontaine, Optical characterization of bulk GaBi<sub>x</sub>As<sub>1-x</sub> and GaAs/ GaBi<sub>x</sub>As<sub>1-x</sub> quantum well structures, Novel Gain Materials and Devices Based on III-V-N/hiBi Compounds, 24-26 September, 2013, Istanbul, Turkey
- C. Cetinkaya, O. Donmez, A. Erol, M. C. Arıkan, J. Puustinen, and M. Guina, Electronic transport in n - and p - type modulation doped Ga<sub>1-x</sub>In<sub>x</sub>N<sub>y</sub>As<sub>1-y</sub>/ GaAs quantum well structures, TPS 30. International Physics Congress, 2-5 September 2013, Istanbul, Turkey
- O. Donmez, A. Erol and M.C. Arıkan, Photoreflectance spectroscopy of highly mismatched alloys, TPS 30. International Physics Congress, 2-5 September 2013, Istanbul, Turkey
- O. Donmez, A. Erol, M. Cetin Arıkan, Optical characterization of dilute GaBiAs alloys, Nanoscience and Nanotechnology Conference, 24 - 28 June 2013, Erzurum, Turkey
- O. Donmez, A. Erol, M. C. Arıkan, Janne Puustinen and Mircea Guina, Photoreflectance spectroscopy on dilute GaBiAs alloys, European Molecular Beam Epitaxy Workshop, 10-13 March 2013, Levi, Finland
- F. Sarcan, O. Donmez, M. Vaughan, A. Erol, M.C. Arıkan, J. Puustinen, M. Guina, Investigation of Nitrogen dependent in-plane electron and hole effective masses in GaInNAs/GaAs quantum well, European Molecular Beam Epitaxy Workshop, 10-13 March 2013, Levi, Finland
- F. Sarcan, O. Donmez, M. Vaughan, A. Erol, M.C. Arıkan, J. Puustinen, M. Guina, Effects of alloy and interface roughness scatterings on the carrier mobility in n- and p-type modulation-doped GaInNAs/GaAs quantum well structures, European Molecular Beam Epitaxy Workshop, 10-13 March 2013, Levi, Finland
- O. Donmez, F. Nutku, A. Erol, M. C. Arıkan and Y. Ergun, A Study of Photomodulated Reflectance on Staircase n-type GaAs/Al[x]Ga[1-x]As Quantum Well Structures, International Conference on Superlattices, Nanostructures, and Nanodevices, July 22-27, 2012, Dresden, Germany
- E. Akalin, A. Erol, F. Sarcan, O. Donmez, S. Akyuz, M.C.Arıkan, J. Puustinen, M. Guina, Characterization of as-grown and annealed modulation doped Ga<sub>1-x</sub>In<sub>x</sub>N<sub>y</sub>As<sub>1-y</sub> /GaAs quantum well structures using Infrared spectroscopy and Raman scattering techniques, International Conference on Superlattices, Nanostructures, and Nanodevices, July 22-27, 2012, Dresden, Germany
- F. Sarcan, O. Donmez, M. Gunes, A. Erol, M.C. Arıkan, J. Puustinen, M. Guina, An analysis of Hall mobility in as-grown and annealed n- and p-type modulation doped GaInNAs/GaAs quantum well, International Conference on Superlattices, Nanostructures, and Nanodevices, July 22-27, 2012, Dresden, Germany
- O. Donmez, F. Sarcan, A. Erol, M.C. Arıkan, F. Ungan, E. Kasapoglu, H. Sari, J. Puustinen, M. Guina, A comprehensive study of optical characterization of n- and p- type as-grown and annealed modulation doped GaAs/GaInNAs QW structures, International Conference on Superlattices, Nanostructures, and Nanodevices, July 22-27, 2012, Dresden, Germany
- O. Donmez, M. Gunes, A. Erol, M.C. Arıkan, N. Balkan, W. J. Schaff, The role of dislocation-induced scattering in electronic transport in Ga<sub>x</sub>In<sub>1-x</sub>N alloys, International Conference on Superlattices, Nanostructures, and Nanodevices, July 22-27, 2012, Dresden, Germany
- O. Donmez, A. Erol and M.C. Arıkan, Analysis of Line Shape and Modulation Mechanisms on Low Dimensional Dilute Nitride structures, E-MRS 2012 Spring Meeting, 14-18 May 2012, Strasbourg, France
- F. Sarcan, O. Donmez, M. Gunes, A. Erol, M. C. Arıkan, J. Puustinen, M. Guina, Effects of thermal annealing on optical and electronic transport properties in n- and p-type Modulation Doped GaInNAs/GaAs Quantum Wells, E-MRS 2012 Spring Meeting, 14-18 May 2012, Strasbourg, France
- M. Gunes, A. Erol, F. Sarcan, O. Donmez, M. C. Arıkan, J. Puustinen, M. Guina, Electronic transport in n- and p- modulation doped GaInAs/GaAs and dilute nitride GaInNAs/GaAs Quantum Well: Determination of effect of Nitrogen on momentum relaxation of electrons and holes, E-MRS 2012 Spring Meeting, 14-18 May 2012, Strasbourg, France
- M. Gunes, O. Donmez, A. Erol, M.C. Arıkan, N. Balkan, Optical and electrical properties of InN/GaN and GaN/InN/GaN heterostructures, 5-8 September 2012, Bodrum, Turkey

O. Donmez, A. Erolan M.C. Arıkan, Non-destructive room temperature optical characterization of bulk and low dimensional semiconductor structures using modulation spectroscopy, TPS 29. International Physics Congress, 5-8 September 2012, Bodrum, Turkey

F. Sarcan, O. Dönmez, M. Gunes, A. Erol, M.C. Arıkan, An analysis of scattering mechanisms as grown and annealed n-and p type modulation doped GaInNAs/GaAs quantum wells, TPS 29. International Physics Congress, 5-8 September 2012, Bodrum, Turkey

O. Donmez, A. Erol, M.C. Arıkan, F. Ungan, E. Kasapoglu, H. Sari, J. Puustinen, M. Guina Optical characterization of the GaInNAs/GaAs n-type as-grown and annealed modulation doped quantum well structures, International Conference on Transparent Optical Networks (ICTON), 27-28 June 2011, Stockholm, Sweden

M. Gunes, O. Donmez, M. Yılmaz, A. Erol, M. C. Arıkan, B. Uluğ, A. Uluğ, N. Balkan, A. O. Ajagunna, E. Iliopoulos, A. Georgakilas, Optical and electrical properties of non-intentionally doped InN/GaN and GaN/InN/GaN heterostructures, International Conference on Transparent Optical Networks (ICTON), 27-28 June 2011, Stockholm, Sweden

O. Donmez, M. Yılmaz, A. Erol, B. Uluğ, M.Ç. Arıkan, A. Uluğ, A. O. Ajagunna, E. Iliopoulos, A. Georgakilas, Influence of high electron concentration on band gap and effective electron mass of InN, E-MRS 2010 Spring Meeting, 7-11 June 2010, Strasbourg, France

O. Donmez, M. Yılmaz, A. Erol, B. Uluğ, M.Ç. Arıkan, A. Uluğ, Optical and electrical properties of In-rich  $Ga_xIn_{1-x}N$  structures, MRS 2010 Spring Meeting, 7-11 June 2010, Strasbourg, France

O. Donmez, E.M. Kendirlik, M. Yılmaz, A. Erol, A. Uluğ, M.Ç. Arıkan, B. Uluğ, Electronic transport in In-rich  $Ga_xIn_{1-x}N$ , MRS 2010 Spring Meeting, 7-11 June 2010, Strasbourg, France

H. Basak, O. Donmez, A. Erol, M.C. Arıkan, M. Saarinen, The effects of quantum well numbers and thermal annealing on optical properties of GaInNAs/GaAs quantum well structures, MRS 2010 Spring Meeting, 7-11 June 2010, Strasbourg, France

B. Royall, N. Balkan, O. Donmez, H. Recber-Başak, A. Erol, M.C. Arıkan, J. Puustinen, V. Korpijärvi, M. Guina, J. Roberts, Spectral dependence and the Effect of Trapping in the Performance of GaInNAs / GaAs Multi-Quantum Well Solar Cells at Low Temperatures, MRS 2010 Spring Meeting, 7-11 June 2010, Strasbourg, France

O. Donmez, M. Yılmaz, A. Erol, B. Uluğ, M.Ç. Arıkan, A. Uluğ, A. O. Ajagunna, E. Iliopoulos, A. Georgakilas, Photoluminescent Properties of InN Thin Films, VI. Nanoscience and Nanotechnology Conference, 15-18 Haziran 2010, Çeşme-İzmir, Turkey

O. Donmez, A. Erol, M. C. Arıkan, Reflectance and Photomodulated Reflectance Studies of Hot Electron Lasing and Light Emitting in Semiconductor Heterostructures, International Conference on Nanomaterials and Nanosystems, 11-13 Ağustos 2009, ITU, Maslak, Turkey

O. Donmez, A. Erol, M. C. Arıkan, Reflectance and Photomodulated Reflectance Studies of  $Al_xGa_{1-x}As/GaAs$  Hot Electron Lasing and Light Emitting in Semiconductor Heterostructures, ICO-PHOTONICS-DELPHI, 7-9 October 2009, Delphi, Greece

O. Donmez, M. Cetin Arıkan and A. Erol, Photomodulated reflectance study of  $Al_xGa_{1-x}As/GaAs$  Hot Electron Lasing and Light Emitting in Semiconductor Heterostructures, Nanoscience and Nanotechnology Conference, 8-12 June 2009, Eskişehir, Turkey

## Scholarly activities

2013 Meeting local organizer, COST Action MP0805 "Novel Gain Materials and Devices Based on III-V-N/Bi Compounds", September 2013, Istanbul, Turkey

2010 Meeting local organizer, COST Action MP0805 "Novel Gain Materials and Devices Based on III-V-N Compounds", April 2010, Istanbul, Turkey

2006 Meeting local organizer, “International Conference on Superlattices, Nanostructures and Nanodevices (ICSNN 2006)”, Istanbul, Turkey

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