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Education

Ph.D.

Physics (Optics and Laser), Shiraz University, Shiraz, Iran

Thesis: *The Novel Improvements to Finite Difference Time Domain Modeling: Applications in Nano-Optics and Nano-Photonics*

M.Sc.

Physics (Atomic and Molecular Physics), Shiraz University, Shiraz, Iran

Thesis: *Computer Simulation of Microwave and Millimeter Wave Spectral Line Shapes*

B.Sc.

Applied Physics (Solid State), ShahidBeheshti University, Tehran, Iran

BSc Project: *Design and fabrication of a CO₂ Laser*

Current Research Interests

Nano-Optics and Nano-Photonics

FDTD modeling

Plasmonic Components and Devices

Parallel computing

Applied Spectroscopy and Optical Remote Sensing

List of Publications

Journals

A. Mohammadi, H. Nadgaran, and M. Agio, *Contour-path effective permittivities for the two-dimensional finite-difference time-domain method*, Opt. Express 13, 10367 (2005).

A. Mohammadi, M. Agio, *Dispersive contour-path finite-difference time-domain algorithm for modeling surface plasmon polaritons at flat interfaces*, Opt. Express 14, 11330 (2006).

T. Jalali, K. Rauscher, A. Mohammadi, D. Erni, Ch. Hafner, W. Baechtold, M.Z. Shoushtari, *Efficient effective permittivity treatment for the 2D-FDTD simulation of photonic crystals*, J. Comput. Theor. Nanosci. 4,644 (2007).

A. Mohammadi, T. Jalali, M. Agio, *Dispersive contour-path algorithm for the two-dimensional finite-difference time-domain method*, Opt. Express 16, 7397 (2008).

A. Mohammadi, V. Sandoghdar and M. Agio, *Gold nanorods and nanospheroids for enhancing spontaneous emission*, New J. Phys. 10, 105015 (2008).

A. Mohammadi, F. Kaminski, V. Sandoghdar, M. Agio, *Spheroidal nanoparticles as nanoantennas for fluorescence enhancement*, Int. J. Nanotechnol. 6, 902, (2009).

A. Mohammadi, V. Sandoghdar, M. Agio, *Gold, Copper, Silver and Aluminum nanoantennas to enhance spontaneous emission*, J. Comput. Theor. Nanosci. 6, 2024 (2009).

A. Mohammadi, F. Kaminski, V. Sandoghdar, M. Agio, *Fluorescence enhancement with the optical (bi-) conical antenna*, J. Phys. Chem. C 114, 7372 (2010).

A. Mohammadi, M. Agio, *Light scattering under nanofocusing: Towards coherent nanoscopies*, Opt. Commun. (2012), DOI:10.1016/j.optcom.2011.12.074

X. Chena, A. Mohammadib, A. Baradaran Ghasemic, M. Agio, *Ultrafast coherent nanoscopy*, Molecular Physics, Accepted (2013).

محمدی احمد. مدل سازی نانوآنتن‌ها با روش BOR-FDTD و بررسی تاثیر فاصله بر فلوئورسانس. مدل سازی در مهندسی. ۱۳۹۲؛ ۱۱ (۳۲): ۶۱-۷۲.

A. Mohammadi, R. Hemmatzadeh, *Improving optical absorptivity of natural dyes for fabrication of efficient dye-sensitized solar cells*, Journal of Theoretical and Applied Physics, (2013) 7235-7

A. Mohammadi, A. Firoozi, *Efficient FDTD Modeling of light trapping in nanoplasmonic solar cells*, International journal of academic research, International Journal of Academic Research, (2015) 1-9.

A. Mohammadi, A. Firoozi, A. Mohammadi, *Enhancement of Upconversion Efficiency in Solar Cells by Plasmonic Nanostructures*, Bulletin of environment pharmacology and life sciences, Bulletin of environment pharmacology and life sciences, (2015) 1-9.

A. Firoozi, A. Mohammadi, *Design of plasmonic backcontact nanogratings for broadband and polarization-insensitive absorption enhancement in thin film solar cell*, International Journal of Modern Physics B, (2015) 1550111-1-1550111-13.

Conference Contributions

آرزو فیروزی، احمد محمدی، "طراحی سلول‌های خورشیدی نانوپلاسمونیک با استفاده از روش FDTD". دومین همایش ملی و کارگاه‌های تخصصی علوم و فناوری نانو، دانشگاه خوارزمی، اردیبهشت ۱۳۹۴.

A. Firoozi, A. Mohammadi, *Enhancing light trapping in thin film solar cells by employing plasmonic nanowires with triangular cross sections*, Applied Research in Engineering and Basic Sciences, 1(1) March 2015.

A. Mohammadi, A. Firoozi, *Light Trapping in Solar cells by using Waveguide Modes*, National e-Conference on Advances in Basic Science and Engineering, Iran 2014.

A. Mohammadi, A. Firoozi, *Absorption Enhancement in Solar cells by Using Silicon Nanowires*, The First National Electronic Conference On Applications Of Physics Jahrom University– 6, 7 February 2013.

A. Mohammadi, A. Firoozi, *Enhancing Solar cells efficiency by Using Fabry-Perot Modes*, Iranian Conference on Optics & Laser Engineering-9&10 October 2013.

A. Mohammadi, R. Hemmatzadeh, *Investigating the Effect of Optical Absorption Enhancement of Natural Dyes on Dye-Sensitized Solar Cells Performance*, Iranian Conference on Optics & Laser Engineering-9&10 October 2013.

A. Mohammadi, A. Firoozi, *FDTD Calculation of Absorption Enhancement in Solar cells Due to Coupled Surface Plasmon in Nanowires*, International Congress on Nanoscience & Nanotechnology, September, Kashan, Iran, 2012.

A. Mohammadi, R. Hemmatzadeh, *Designing Antireflection Nanowires on Thin Film Solar Cells by Using the Finite Element Method*, The National Conference on Finite Element Methods in Applied Physics, Ahvaz, Iran, 2012.

A. Mohammadi, A. Firoozi, *Nanoplasmonic Solar cells*, First Iranian Conference on Nano Electronics, 1-2 November 2012.

A. Mohammadi, R. Hemmatzadeh, *Design and fabrication of dye sensitized solar cell*, First Iranian Conference on Nano Electronics, 1-2 November 2012.

A. Mohammadi, M. Agio, *Dispersive contour-path FDTD algorithm for modeling plasmon resonances in metal nanostructures*, 4th Workshop on Numerical Methods for Optical Nano Structures, ETH Zurich, Switzerland, July 7-9, 2008.

A. Mohammadi, F. Kaminski, V. Sandoghdar, M. Agio, *FDTD analysis of plasmon coupling between two interacting spheroidal nanoparticles*, The 2nd Conference on Nanostructures, Kish, Iran, March 11-14, 2008.

A. Mohammadi, F. Kaminski, V. Sandoghdar, M. Agio, *FDTD calculations of the decay rates for a single emitter coupled to a gold nanoantenna*, WE-Heraeus-Seminar on Computational Nano-Photonics, Bonn, Germany, 26 - 28 February 2007

A. Mohammadi, T. Jalali, *The BOR-FDTD code with applications in nano-optics and nano-photonics*, 13th Conference on Optics and Photonics, Tehran, Iran, February 2007

A. Mohammadi, M. R. HormoziNezhad, H. Nadgaran, *FDTD calculation of light scattering by 2D nanoparticles*, Nano-Technology in Environments Conference, Isfahan, Iran, February 2007

A. Mohammadi, M. Agio, *Improved finite-difference time-domain modeling of surface plasmons*, XV International Workshop on Optical Waveguide Theory and Numerical Modeling, Varese, Italy, 20-21 April 2006.

L. Rogobete, A. Mohammadi, M. Agio, V. Sandoghdar, *Electromagnetic simulation at the nanoscale*, First Micro Nano Science Platform Workshop, Luzern, Switzerland, 5-6 October 2005.

A. Mohammadi, H. Nadgaran, *A program for calculating the single-scattering properties for a particle of arbitrary shape*, Computational Physics Conference, Genoa, Italy, September 2004.

H. Nadgaran, A. Mohammadi, R. Mohammadi, *Measurements of air pollutants concentrations with differential optical absorption spectroscopy (DOAS) method*, 10th Annual Conference Photonics, Mahan, Iran, January 2004.

A. Mohammadi, H. Nadgaran, H. Chizari, *Modified differential optical absorption spectroscopy system using neural networks and computer simulation*, 18th Colloquium on high resolution molecular spectroscopy, Dijon, France, September 2003.

H. Nadgaran, A. Mohammadi, H. Chizari, *A neural network based method for accuracy enhancement of air pollutant concentration*, 2nd International DOAS Workshop 2003, Heidelberg, Germany, September 2003.

H. Nadgaran, A. Mohammadi, R. Mohammadi, *The design of a computer-controlled hardware to control the calibration level of a DOAS system for improving the system performance*, 2nd International DOAS Workshop, Heidelberg, Germany, September 2003.

Visits, Workshops and Schools

Visiting student in the Nano-Optics group, Laboratory of Physical Chemistry, ETH Zurich, Switzerland, May 2005-May 2006.

ICPT-INFM-DEMOCRITOS-ISMO-IUT School on Electronic-structure calculations and their applications in materials science, Isfahan, Iran, April 2005.

2nd international DOAS Workshop 2003, Heidelberg, Germany, September 2003.

Joint ICTP-INFM School/Workshop on *Entanglement at the nanoscale*, Trieste, Italy, November 2002.

International Summer School on Optics and Photonics, Tabriz, Iran, August 2001.

Membership in Professional Societies

Optical Society of America (OSA)

Optics and Photonics Society of Iran

Iranian Nanotechnology Society