

## Institute of Physics

Chair of Applied Electrodynamics and Modeling

Head of the chair, professor

## 📖 Publications

---

*Article*

### **Dielectric coated conductive rod resonantly coupled with a cut transmission line as a tunable microwave bandstop filter and sensor**

David Hambaryan, Tigran Abrahamyan, Henrik Parsamyan, Artyom Movsisyan, Bill Minasyan,

Hovhannes Haroyan, Arsen Babajanyan, Kiejin Lee, Barry Friedman, Khachatur Nerkararyan

Heliyon 2024 e24477

---

*Article*

### **Characterization of interaction phenomena of electromagnetic waves with metamaterials via microwave near-field visualization technique**

Zhirayr Baghdasaryan, Arsen Babajanyan, Barry Friedman, Kiejin Lee

Scientific Reports 2023 18457

---

*Article*

### **3D visualization of microwave electric and magnetic fields by using a metasurface-based indicator**

Zhirayr Baghdasaryan, Arsen Babajanyan, Henrik Parsamyan, Barry Friedman, Seungwan Kim,

Jung-Ha Lee, Kiejin Lee

Scientific Reports 2022 6150

---

*Article*

### **Characterization of Metal Nanoparticles Aqueous Solution by a Thermoelastic Optical Indicator Microscope**

G. Ohanyan, N. Margaryan, M. Manvelyan, L. Odabashyan, B. Minasyan, A. Movsisyan, R. Khachatryan,

A. Babajanyan

Journal of Contemporary Physics (Armenian Academy of Sciences) 2022 187-191

---

*Article*

### **3D Visualization Method Based on Metastructure Optical Indicator of Thermoelastic Polarization Microscope for Electromagnetic Fields in Microwave and THz Ranges**

A. Babajanyan, Zh. Baghdasaryan, H. Parsamyan, B. Friedman, K. Lee

NanoWorld Journal 2022 S4

---

*Article*

### **Resonant Interaction Between Microwaves and Thin Conducting Microstructure with Finite Length**

T. Abrahamyan, H. Haroyan, D. Hambaryan, H. Parsamyan, K. Lee, A. Babajanyan, Kh. Nerkararyan

NanoWorld Journal 2022 S5

---

*Article*

**Microwave and Joule Heating Visualization by a Thermo-Elastic Microscope for Carbon Composite Materials**

Sh. Arakelyan, A. Babajanyan, G. Berthiau, B. Friedman, K. Lee

Springer Proceedings in Physics (Optics and Its Applications) 2022 69-77

---

*Article*

**Surface-standing-wave formation via resonance interaction of a finite-length conductive rod with microwaves**

Tigran Abrahamyan, Hovhannes Haroyan, David Hambaryan, Henrik Parsamyan, Arsen Babajanyan, Kiejin Lee, Barry Friedman, Khachatur Nerkararyan

Journal of Physics D: Applied Physics 2022 445001

---

*Article*

**Microwave response phase control of a graphite microstrip**

Arsen Babajanyan, Tigran Abrahamyan, Hovhannes Haroyan, Billi Minasyan, Torgom Yezekyan, Kiejin Lee, Barry Friedman, Khachatur Nerkararyan

Carbon 2022 151-156

---

*Article*

**Noninvasive in Vivo Evaluation of Mouse-Blood Glycemia with a Microwave Spiral Sensor**

A. Babajanyan, B. Minasyan, L. Odabashyan, S. Kim, J. Kim, J.-H. Lee, B. Friedman, K. Lee

Journal of Contemporary Physics (Armenian Academy of Sciences) 2021 47-54

---

*Article*

**Visualization of microwave near-field distribution in sodium chloride and glucose aqueous solutions by a thermo-elastic optical indicator microscope**

Arsen Babajanyan, Zhirayr Baghdasaryan, Levon Odabashyan, Jung-Ha Lee, Barry Friedman, Kiejin Lee

Scientific Reports 2021 2589

---

*Article*

**Performance of Pentacene Based Organic Thin Film Transistor with an Octadecyltrichlorosilane Self-Assembled Monolayer Interface**

A. Babajanyan, B. Minasyan, A. Movsisyan, B. Friedman, K. Lee

Journal of Contemporary Physics (Armenian Academy of Sciences) 2021 208-213

---

*Manual*

**Ատոմային և միջուկային ֆիզիկայի ընդհանուր դասընթացի լաբորատոր աշխատանքների ուղեցույց**

Հասմիկ Շահինյան, Լուսինե Ղազարյան, Արսեն Բաբաջանյան

2021 64

---

*Article*

**Detection of Iron Nanoparticles in Aqueous Solutions by Microwave Sensor**

L. Odabashyan, N. Margaryan, G. Ohanyan, M. Manvelyan, D. Hambaryan, T. Abrahamyan, R. Khachatryan, A. Babajanyan

Journal of Contemporary Physics (Armenian Academy of Sciences) 2020 171-175

---

*Article*

**Thermal distribution in unidirectional carbon composite material due to the direct heating and microwave influence visualized by a thermo-elastic optical indicator microscope**

Zhirayr Baghdasaryan, Arsen Babajanyan, Levon Odabashyan, Shant Arakelyan, Hanju Lee,  
Gerard Berthiau, Barry Friedman, Kiejin Lee  
Measurement 2020 107189(1-7)

---

*Article*

**ОБНАРУЖЕНИЕ НАНОЧАСТИЦ ЖЕЛЕЗА В ВОДНЫХ РАСТВОРАХ С ПОМОЩЬЮ  
МИКРОВОЛНОВОГО СЕНСОРА**

Л. ОДАБАШЬЯН, Н. МАРГАРЯН, Г. ОГАНЯН, М. МАНВЕЛЯН, Д. АМБАРЯН, Т. АБРААМЯН, Р. ХАЧАТРЯН,  
А. БАБАДЖАНИЯН  
Известия НАН РА. Физика (Journal of Contemporary Physics (Armenian Academy of Sciences) 2020  
251-258

---

*Article*

**COMPUTER MODELING OF MICROWAVE STRIPLINE RESONATORS FOR NON-INVASIVE SENSING**

A. Zh. BABAJANYAN, B. J. MINASYAN, L. A. ODABASHYAN, Zh. A. BAGHDASARYAN, K. LEE  
Proceedings of the YSU. Physical and Mathematical Sciences 2019 60-64

---

*Article*

**Antenna Investigation by a Thermoelastic Optical Indicator Microscope: Defects Measurement  
and 3D Visualization of Electromagnetic Fields**

Arsen Babajanyan, Shant Arakelyan, Hanju Lee, Seungwan Kim, Gerard Berthiau, Barry Friedman,  
Kiejin Lee  
IEEE ANTENNAS AND PROPAGATION MAGAZINE 2019 27-31

---

*Article*

**Investigation of Ag Nanoparticles/Water Solutions by Microwave Stripline Sensor**

A. Babajanyan, T. Abrahamyan, R. Khachatryan, D. Hambaryan, B. Hovhannisyanyan, B. Minasyan,  
L. Odabashyan  
Journal of Contemporary Physics (Armenian Academy of Sciences) 2019 196-202

---

*Article*

**ИССЛЕДОВАНИЕ РАСТВОРОВ НАНОЧАСТИЦ Ag В ВОДЕ С ПОМОЩЬЮ МИКРОВОЛНОВОГО  
ПОЛОСКОВОГО СЕНСОРА**

А. БАБАДЖАНИЯН, Т. АБРАМЯН, Р. ХАЧАТРЯН, Д. АМБАРЯН, Б. ОГАНЕСЯН, Б. МИНАСЯН,  
Л. ОДАБАШЯН  
Известия НАН РА. Физика (Journal of Contemporary Physics (Armenian Academy of Sciences) 2019  
263-271

---

*Article*

**Real-time sensing the glucose concentration by quadratic-shaped microwave sensor**

A. Zh. BABAJANYAN, B. A. HOVHANNISYAN, D. S. HAMBARYAN, L. A. ODABASHYAN  
Proceedings of the YSU. Physical and Mathematical Sciences 2019 132-137

---

*Article*

**Real-Time Noninvasive Measurement of Glucose Concentration Using a Modified Hilbert  
Shaped Microwave Sensor**

Levon Odabashyan, Arsen Babajanyan, Zhirayr Baghdasaryan, Seungwan Kim, Jongchel Kim,  
Barry Friedman, Jung-Ha Lee, Kiejin Lee  
Sensors 2019 5525(1-11)

---

Article

**Microwave Heating Visualization for Carbon Fibers Composite Material: Development of Tunable Microstrip Structures**

Shant Arakelyan, Hanju Lee, Do-Suck Han, Arsen Babajanyan, Gerard Berthiau, Barry Friedman,

Kiejn Lee

IEEE Transactions on Microwave Theory and Techniques 2018 883-888

---

Article

**Microwave Fractal Bandpass Filters Based on Modified Hilbert Curves of the First and the Second Orders**

A. Babajanyan, H. Parsamyan, K. Lee

Journal of Contemporary Physics (Armenian Academy of Sciences) 2018 146-151

---

Article

**МИКРОВОЛНОВЫЕ ФРАКТАЛЬНЫЕ ПОЛОСОВЫЕ ФИЛЬТРЫ, ОСНОВАННЫЕ НА МОДИФИЦИРОВАННЫХ КРИВЫХ ГИЛЬБЕРТА ПЕРВОГО И ВТОРОГО ПОРЯДКОВ**  
Г. ПАРСАМЯН, А. БАБАДЖАНЫАН, К. ЛЕЕ

Известия НАН РА. Физика (Journal of Contemporary Physics (Armenian Academy of Sciences) 2018 193-200

---

Article

**DETERMINATION OF GLUCOSE CONCENTRATION IN AQUEOUS SOLUTION BY USING MODIFIED HILBERT SHAPED MICROWAVE METAMATERIAL SENSOR**

H. A. PARSAMYAN, A. Zh. BABAJANYAN, Sh. Kh. ARAKELYAN, K. LEE

Proceedings of the YSU. Physical and Mathematical Sciences 2018 144-148

---

Article

**Performance of Pentacene-based Thin-film Transistors Fabricated at Different Deposition Rates**

Arsen Babajanyan, Jinho Hwang, Duri Kim, Meenwoo Kim, Hanju Lee, Levon Odabashyan,

Zhirayr Baghdasaryan, Kiejn Lee, Deokjoon Cha

New Physics: Sae Mulli 2018 1192-1195

---

Article

**Glucose Aqueous Solution Sensing by Modified Hilbert Shaped Microwave Sensor**

A. Babajanyan, L. Odabashyan, Zh. Baghdasaryan, B. Friedman, K. Lee

Armenian Journal of Physics 2018 214-222

---

Article

**Visualization of Microwave Heatingformesh-Patterned Indium-tin-Oxide by a Thermo-Elastic Optical Indicator Microscope**

A. Babajanyan, Zh. Baghdasaryan, L. Odabashyan, H. Lee, B. Friedman, K. Lee

Armenian Journal of Physics 2018 175-179

---

Article

**Direct imaging of the SSD and USB memory drives heating by thermo-elastic optical indicator microscopy**

Shant Arakelyan, Hanju Lee, Yeonghun Jeong, Arsen Babajanyan, Barry Friedman, Kiejn Lee

Case Studies in Thermal Engineering 2017 407-412

---

Article

**Characterization of Anisotropic Electrical Conductivity of Carbon Fiber Composite Materials by a Microwave Probe Pumping Technique**

Hanju Lee, Ogsen Galstyan, Arsen Babajanyan, Barry Friedman, Gerard Berthiau, Jongchel Kim,

Do Suck Han, Kiejin Lee

Journal of Composite Materials 2016 1999-2004

<https://us.sagepub.com/en-us/nam/journal/journal-composite-materials#description>

---

Article

**Effects of Thermal Preparation on Copper Phthalocyanine Organic Light Emitting Diodes**

Sul A. Choi, Kyungchul Kim, Su Jin Lee, Hanju Lee, Arsen Babajanyan, Barry Friedman, Kiejin Lee

Journal of Luminescence 2016 149-153

<http://www.sciencedirect.com/science/journal/00222313>

---

Article

**Direct Current Imaging Using a Magneto-Optical Sensor**

Shant Arakelyan, Ogsen Galstyan, Hanju Lee, Arsen Babajanyan, Jung-Ha Lee, Barry Friedman, Kiejin Lee

SENSORS AND ACTUATORS A-PHYSICAL 2016 397-401

<http://www.journals.elsevier.com/sensors-and-actuators-a-physical>

---

Article

**Characteristics of Light Transfer in the Connected Conical Waveguides With the Same Symmetry Axis**

Shant Arakelyan, Tigran Abrahamyan, Arsen Babajanyan, Khachatur Nerkararyan

Applied Optics 2016 3854-3857

<https://www.osapublishing.org/ao/home.cfm>

---

Article

**Near-Field Scanning Microwave Microscope As Nano-Resolution Characterization Technique**

Babajanyan A. J., Friedman B., Lee K.

Физические Основы приборостроения 2016 98-111

[http://elibrary.ru/title\\_about.asp?id=37911](http://elibrary.ru/title_about.asp?id=37911)

---

Article

**Nondestructive Label-Free Mapping of DNA Bioassay Using a Near-Field Scanning Microwave Microscope**

Arsen Babajanyan, Barry Friedman, Kiejin Lee

Armenian Journal of Physics 2016 148-153

<http://ajp.asj-oa.am/>

---

Article

**Specifications of Rabi oscillations in the quantum emitters systems coupled to the localized plasmon polaritons**

A. Zh. Babajanyan, S. Kh. Nerkararyan

ԵՊՀ Գիտական տեղեկագիր, Բնական գիտություններ 2016 48-52

<http://ysu.am/science/hy/1355990920>

---

Article

**Pre-Annealing Effects on a Pentacene Organic Thin Film Transistor With a Polymer Dielectric Interface**

Arsen Babajanyan, Sul A Choi, Kyungchul Kim, Shant Arakelyan, Hanju Lee, Barry Friedman, Kiejin Lee  
PROCEEDINGS of the International Conference on Microwave and THz Technologies, Photonics and  
Wireless Communications  
2016 61-64  
<http://irphe.asj-oa.am/93/1/Proceedings-IRPhE-2016.pdf>

---

*Article*

**Magneto-Optical Visualization by Bi:YIG Thin Films Prepared at Low Temperatures**  
Ogsen Galstyan, Hanju Lee, Arsen Babajanyan, Arsen Hakhoumian, Barry Friedman, Kiejin Lee  
Journal of Applied Physics 2015 163914. 6  
<http://aip.scitation.org/jap/info/contact>

---

*Article*

**Sensitive Detection of Nano-Scale Vibrations by the Metal-Coated Fiber Tip at the Liquid-Air Interface**  
A. J. Babajanyan, T. A. Abrahamyan, H. A. Minasyan, Kh. V. Nerkararyan  
International Journal of Mechanical, Aerospace, Industrial and Mechatronics Engineering 2015 651-654  
<https://www.waset.org/journal/Mechanical>

---

*Article*

**Influence of Bismuth Substitution on Yttriumorthoferrite Thin Films Preparation by the MOD Method**  
Ogsen Galstyan, Hanju Lee, Jongwon Park, Jung-Ha Lee, Arsen Babajanyan, Barry Friedman, Kiejin Lee  
Journal of Magnetism and Magnetic Materials 2015 310-314  
<http://www.journals.elsevier.com/journal-of-magnetism-and-magnetic-materials>

---

*Manual*

«Վիճակագրական ռադիոֆիզիկա» լաբորատոր աշխատանքների ձեռնարկ  
Ա. Ժ. Բաբաջանյան, Վ. Ռ. Թադևոսյան, Հ. Ս. Հարոյան, Ա. Հ. Մակարյան  
2012 86

---

*Conference*

**Sensitive Detection of Nano-Scale Vibrations by the Metal-Coated Fiber Tip at the Liquid-Air Interface**  
A. J. Babajanyan, T. A. Abrahamyan, H. A. Minasyan, Kh. V. Nerkararyan

---

*Conference*

**In Vitro Monitoring of HbA1C by a Microwave Biosensor**  
Seungwan Kim, Jongchel Kim, Armen Abrahamyan, Arsen Babajanyan, Jung-Ha Lee, Barry Friedman,  
Kiejin Lee

---

*Conference*

**Nondestructive label-free mapping of DNA bioassay using a near-field scanning microwave microscope**  
Arsen Babajanyan, Barry Friedman, Kiejin Lee

---

*Conference*

**Microwave and Joule Heating Visualization by Thermo-Elastic Sensor for Carbon Fibers Composite Material**  
Kiejin Lee, Shant Arakelyan, Hanju Lee, Sunghoon Jeon, Do-Suck Han, G. Berthiau, Arsen Babajanyan

---

*Conference*

**Detection of Resonant Oscillations of the Liquid Surface by using a Tapered Fiber Opto-Mechanical Sensor**

Tigran Abrahamyan, Stella Sargsyan, Arsen Babajanyan, Khachatur Nerkararyan

---

*Conference*

**Pre-Annealing Effects on a Pentacene Organic Thin Film Transistor with a Polymer Dielectric Interface**

Arsen Babajanyan, Sul A Choi, Kyungchul Kim, Hanju Lee, Barry Friedman, Kiejin Lee

---

*Conference*

**The Resonant Coupling of the Quantum Dots in the Environment of Metal Nanoparticle at Optical Frequencies**

Sona Nerkararyan, Arsen Babajanyan, Khachatur Nerkararyan

---

*Conference*

**Microwave Characterization of Complex Dielectric Permittivity Dependence on Glucose Concentration in Blood Serum and Aqueous Solution**

Babajanyan A., Lee K., Kim S., Kim J., Friedman B., Arakelyan Sh., Parsamyan H.

---

*Conference*

**Label-Free Monitoring of HbA1C by Microwaves**

Babajanyan A., Kim S., Kim J., Abrahamyan A., Friedman B., Lee K.

---

*Conference*

**Detection of Nanometric Vibrations by Using Opto-Mechanical Sensor**

Arsen Babajanyan, Tigran Abrahamyan, Shant Arakelyan, Khachatur Nerkararyan

---

*Conference*

**Noninvasive In Vitro Monitoring of Hba1c with a Microwave Biosensor**

Arsen Babajanyan, S. Kim, J. Kim, Shant Arakelyan, K. Lee, J.-H. Lee, B Friedman

---

*Conference*

**Detecting Defects in Sub-Skin-Depth Metallic Layers by a Thermo-Elastic Sensor**

Arsen Babajanyan, Shant Arakelyan, Hanju Lee, Kiejin Lee, Barry Friedman

---

*Conference*

**Effect of Pentacene Deposition Rate on OTFT**

Arsen Babajanyan, Jinho Hwang, Duri Kim, Meenwoo Kim, Levon Odabashyan, Zhirayr Baghdasaryan, Seungwan Kim, Jongchel Kim, Hanju Lee, Kiejin Lee, Deokjoon Cha

---

*Conference*

**Characterization of Heat Distribution and Microwave Absorption in a Carbon Composite Material by a Thermo-Elastic Optical Indicator Microscope**

Aarsen Babajanyan, Zhirayr Baghdasaryan, Levon Odabashyan, Hanju Lee, Seungwan Kim, Jongchel Kim, Jinho Hwang, Duri Kim, Meenwoo Kim, Deokjoon Cha, Kiejin Lee

---

*Conference*

**Real-Time Noninvasive Measurement of Glucose Concentration Using a Modified Hilbert**

### **Shaped Microwave Fractal Sensor**

Arsen Babajanyan, Levon Odabashyan, Zhirayr Baghdasaryan, Seungwan Kim, Jongchel Kim, Jinho Hwang, Meenwoo Kim, Hanju Lee, Deokjoon Cha, Kiejin Lee, Duri Kim

---

*Conference*

### **3D visualization of electromagnetic fields and thermal distribution by the thermo-elastic optical indicator microscope**

A. Babajanyan, K. Lee, Zh. Baghdasaryan, L. Odabashyan, S. Kim, J. Kim, Gerard Berthiau, B. Friedman

---

*Conference*

### **Noninvasive in-vitro monitoring of D-glucose concentration by using a microwave fractal sensor**

A. Babajanyan, L. Odabashyan, Zh. Baghdasaryan, T. Abrahamyan, N. Harutyunyan, S. Kim, J. Kim, B. Friedman, K. Lee

---

*Conference*

### **Sensing of silver nanoparticles in aqueous solutions by using an optical fiber probe-tip**

A. Babajanyan, T. Abrahamyan, R. Khachatryan, Kh. Nerkararyan

---

*Conference*

### **Characterization of Ag nanoparticles concentration in aqueous solution by microwave biosensor**

Arsen Babajanyan, Zh. Baghdasaryan, T. Abrahamyan, L. Odabashyan, H. Lee, D. Kim, M. Kim, S. Kim, K. Lee

---

*Conference*

### **Microwave and Joule heating visualization by a thermo-elastic sensor for carbon composite materials**

Shant Arakelyan, Arsen Babajanyan, Gerard Berthiau, Barry Friedman, Kiejin Lee

---

*Conference*

### **Detecting Low Dose of Glucose in the Microwave Range By Using Thermoelastic Optical Indicator Microscope**

Tigran Abrahamyan, Nelli Babajanyan, David Hambaryan, Hasmik Manukyan, Arsen Babajanyan, Kiejin Lee

---

*Conference*

### **Dielectric-Coated Conductive Rod Resonantly Coupled with a Cut Goubau Line as a Sensitive Microwave Sensor**

Tigran Abrahamyan, Hovhannes Haroyan, David Hambaryan, Artyom Movsisy, Henrik Parsamyan, Arsen Babajanyan, Khachatur Nerkararyan, Kiejin Lee

---