

Victor Klymko

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Objective

To provide a meaningful contribution to an active research and development project for new microelectromechanical systems, ultrasonic devices, physics simulation software, or non-destructive testing.

Summary

- A Ph.D. in Physics with advanced experience in Finite Element simulation and code development for piezoelectrics; experimental design of piezoelectric transducers, delay lines, actuators, and cantilevers
- MS in Electrical Engineering with experience in Method of Moments, Green's function, and Finite-Difference Time-Domain methods. Solved problems of excitation, propagation, and scattering of electromagnetic waves in the waveguides with mixed boundary conditions.
- Completed programming projects using Fortran, Matlab, C++, and numerical simulation software: HFSS, QuickWave, COMSOL, PZFlex
- A result-oriented team worker who is able to complete tasks individually

Accomplishments

- Developed a Finite Element code, calculated the displacement and electric potential fields in single crystal ferroelectrics and multidomain ferroelectric superlattices. Identified the modes based on their displacements and calculated their dispersion curves. Reconstructed the acoustic wave propagation from the calculated and measured frequency-dependent displacement field.
- Calculated the piezoelectric coupling of the first 8 modes in LiNbO_3 . Designed, built, and tested a new ultrasonic delay line featuring three modes with the highest coupling coefficient.
- Designed a new multidomain PZT cantilever that produced nearly doubled vibration amplitude compared to the single domain cantilever of the same size.
- Derived the Green's function for electromagnetic waveguides with alternating strips of electric and magnetic conductors. Developed the code and calculated the excitation current and the electric field due to a probe, a dipole, and a closed/unclosed ring using Galerkin procedure of Method of Moments.

Experience

Visiting Assistant Professor

08/2010 - present

Dept. of Physics and Astronomy, Univ. of Mississippi

- Teach General Physics and Physics for Science and Engineering courses
- Supervise physics laboratories
- Maintain active research involving graduate students and senior faculty

Visiting Instructor in Physics

07/2009 – 07/2010

Dept. of Physics and Astronomy, Univ. of Mississippi

- Taught General Physics lectures and laboratories and Astronomy laboratories
- Designed and investigated a new type of a multidomain piezoelectric actuator

Graduate Research Assistant

08/2004 – 05/2009

Condensed Matter laboratory, University of Mississippi

- Studied acoustic waves in multidomain ferroelectric plates
- Calculated dispersion curves and piezoelectric coupling for multidomain LiNbO₃
- Measured the displacement field and velocity of acoustic modes of orders 0th to 2nd
- Designed, modeled, built and measured a new ultrasonic delay line that utilizes three different acoustic modes at their maximum efficiency

Graduate Research Assistant

08/2004 – 05/2009

Computational Electromagnetics laboratory, University of Mississippi

- Derived Electric Dyadic Green's function for waveguides with alternating metallic and dielectric strips
- Calculated total and scattered electromagnetic fields in this type of waveguides due to a probe, a dipole, and a closed and unclosed ring antennas

Education**Ph. D. in Physics**, University of Mississippi, USA

2009

Major: Solid State Physics Advisor: Dr. I. Ostrovskii

Thesis: Plate acoustic waves in Z-cut single crystal and periodically poled lithium niobate.

M. S. in Electrical Engineering, University of Mississippi, USA

2004

Major: Electromagnetics Advisor: Dr. A. Yakovlev

Thesis: Electric dyadic Green's functions for circular waveguide applications.

M.S. in Radio Physics and Electronics, Kharkov National University, Ukraine

1996

Major: Electromagnetics

Thesis: Boundary-value problem for multilayered dielectric waveguides.

Awards

Young Researcher Award, Fundamental Physics of Ferroelectrics Conference (2010)

Research Assistantship, Univ. of Mississippi (2002 – 2004, 2005, 2007)

Teaching Assistantship, Univ. of Mississippi (2004 – 2008)

Grants

Summer research grants from Univ. of MS Graduate School (2006, 2008).

A proposal with Japan Society for the Promotion of Science is pending decision.

Qualifications

Programming: Fortran, Matlab, C++

Scientific: HFSS, COMSOL, PZFlex, Mathematica, Mathcad, Maple, Origin, Gnuplot, The Sky, CCDOps, CCDSOft

OS: Windows, Solaris 10, MacOS X, Linux (Ubuntu 9.10)

Productivity: MS Office, Open Office, Photoshop CS, Illustrator, Lightroom

Web: HTML, Dreamweaver

Languages: Fluent in English, Russian, Ukrainian; some knowledge of French and Japanese

Leadership

- Lecture up to 60 students on everyday basis
- Supervise physics labs and resolve schedule conflicts and academic credit issues
- Outreach to general public at Astronomy Open House monthly events

Visa status: H1B

Selected publications

1. I. V. Ostrovskii, A. B. Nadtochiy, **V. A. Klymko**, “**Velocity dispersion of plate acoustic waves in a multidomain phononic superlattice**,” Phys. Rev. B, **82**(1), 014302 (2010).
2. I. V. Ostrovskii, **V. A. Klymko**, A. B. Nadtochiy, “**Plate wave stop bands in a periodically poled lithium niobate**,” JASA-EL, **125**(4), EL129 (2009).
3. **V. A. Klymko**, A. B. Nadtochiy and I. V. Ostrovskii, “**Theoretical and experimental study of plate acoustic waves in ZX-cut lithium niobate**,” IEEE Trans. UFFC, **55**(12), 2726 (2008).
4. **V. A. Klymko**, A. B. Yakovlev, I. A. Eshrah, A. A. Kishk and A. W. Glisson, “**Dyadic Green’s function of an ideal hard surface circular waveguide with application to excitation and scattering problems**,” Radio Science, **40**, RS3014 (2004).
5. V. K. Kiseliyov, A. V. Kiseliyov, **V. A. Klymko**, T. M. Kushta and P. K. Nesterov, “**A study for quasi-optical waveguide modeling method for measurements of the scattering matrix elements in sub-mm and mm wavelength range**,” Proc. IRE NASU, Ukraine, **6** (1), 39 (2001).

Invited talk: Plate acoustic waves in ferroelectric wafers, University of Tennessee at Knoxville (2009).

Selected presentations

1. **V. A. Klymko**, I. V. Ostrovskii, D. Sedorook, “**Aperiodic multidomain ferroelectric transducers**,” Fundamental Physics of Ferroelectrics symp. (2010).
2. **V. A. Klymko**, I. V. Ostrovskii, “**Phononic band gaps in periodically corrugated lithium niobate plate**,” 156-th meeting Acoust. Soc. Am. (2008).
3. **V. A. Klymko**, A. B. Yakovlev, A. A. Kishk, A. W. Glisson, “**Scattering by closed and unclosed metallic rings in a circular waveguide**,” ACES, 94-101 (2006).
4. V. A. Klymko, A. B. Yakovlev, I. A. Eshrah, A. A. Kishk, A. W. Glisson, “Scattering by open metal obstacles in a circular waveguide: dyadic Green’s function approach,” IEEE-AP Int. symp., 2, 2127 (2004).