Curriculum Vitae

Dr. Emil Prodan, Professor
Department of Physics &
Department of Mathematical Sciences
Yeshiva University
Office room: 510
245 Lexington Avenue
New York, NY 10016
Tel: 212 340 7831
E-mail: prodan@yu.edu

Education:

Postdoctoral Training:

-Aug. 2004-Aug. 2005: Postdoctoral training, University of California Santa Barbara and University of Southern California (advisors: Walter Kohn and Priya Vashishta)

-Aug. 2003-Aug. 2004: Postdoctoral training, University of California Santa Barbara (advisor: Walter Kohn, Nobel Laureate)

PhD:

-April 2003, Rice University, Theoretical Physics (Advisor: Peter Nordlander)

Master degree:

-May 1999: MS, University of Houston, Theoretical Physics

-June 1996: MS, University of Bucharest, Mathematical Physics (Advisor: Gheorghe Nenciu)

Bachelor of Science degree:

-June 1995: BS, University of Bucharest, Theoretical Physics (Thesis: Topological Analysis of Gauge Fields)

Employment:

- 2014-present: Professor, Department of Physics, Yeshiva University
- 2013-2014: Associate Professor, Department of Physics, Yeshiva University
- 2007-2013: Assistant Professor, Department of Physics, Yeshiva University
- 2005-2007: Fellow of the Princeton Center for Complex Materials (Sponsors: Roberto Car and Duncan Haldane)

Funding:

- 2016-2019: Keck Foundation Award ($195,000): "Engineering New Materials Based on Topological Phonon Edge Modes." This is part of a $1,000,000 Keck Foundation award, shared with researchers from New Jersey Institute of Technology.

- 2011-2016: NSF DMR-1056168 ($425,000): "CAREER: Strong Disorder and Electron Interaction Effects in Topological Insulators."

- 2011-2014: NSF DMS-1066045 ($331,314): "Focus Research Group (FRG): Dynamical Processes in Many-Body Systems: Analysis and Simulations." The research team consisted of myself, Weinan E, Roberto Car from Princeton University, and Carlos Cervera from UC Santa Barbara. Each member managed separate budgets; The amount of $331,314 is the

budget I managed at Yeshiva University. The total grant award is $1,450,282.

- 2008-2011: Research Corporation for Science Advancement, Cottrell Science Award ($54,000): "Molecular Electronics Program at Stern College"

General Interests:
Finding connections between various fields of pure mathematics and the physics of condensed matter. Use such connections to search for robust and rigorous solutions to various problems in condensed matter physics and develop robust and efficient numerical methods in order to link the theoretical ideas with concrete experimental realities. Spreading these ideas through pedagogical scientific papers, lectures and collaborations.

Theoretical Projects:
- Novel topological states in aperiodic solids with disordered, quasi-crystalline and fractal structure.
- Theory of charge transport in aperiodic solids under magnetic fields, with a focus on Quantum Hall Effect and disordered Topological Insulators.
- Theory of topological invariants for disordered topological materials.
- Theory of the topological edge and surface states.
- Search and discovery of topological condensed matter systems.
- Investigations of the Riemann surface of the energy bands in periodic crystals.
- Contributions to the modern theory of tunneling transport in molecular chains.
- Investigations of the non-Abelian statistics for the 5/2 Fractional Hall state.
- Studies on the nearsightedness of matter.
- Studies in Constructive Field Theory.
- Developed the "plasmon hybridization theory" in complex nano-structures.
- Developed models and explicit solutions for the electromagnetic response of live cells in suspensions.

Mathematical Physics Projects:
- Applications of operator algebras in condensed matter physics and materials science.
- Applications of Kasparov's K-Theory for complex physical systems
- Applications of Non-Commutative Geometry in condensed matter physics.
- Applications of K-Theory (classical and for C*-algebras) in condensed matter physics.
- Rigorous mathematical studies on the fundamental properties (mathematical formulations, existence and uniqueness of the solutions, symmetry breaking, existence of the thermodynamic limit, etc) of various self-consistent models of the condensed matter, notably the Density Functional Theory and the Hartree approximation.

Numerical Projects:
- Studies on the Anderson localization (using Supersymmetric Quantum Field Theory).
- Implementations of the Non-Commutative Calculus, notably to compute non-commutative topological invariants and transport coefficients in aperiodic solids.
- Exploration of the phase diagram of strongly disordered topological insulators.
- First-principle simulations (mostly DFT) of molecular charge transport.
- First-principle simulations (mostly DFT) of the electronic structure and optical response of nano-structures.

Undergraduate Mentoring (Honors Theses):
-2011: "Topological Phonon Modes in Simple Elastic Structures" by Nina Berg

-2010: “Novel Electroporation Method Based on Cellular Resonant Modes” by Yehudit Fischer

Teaching (undergraduate courses):
Algebra based Introductory Physics, Calculus based Introductory Physics, Thermodynamics and Statistical Physics, Mathematical Physics, Classical Waves, Classical Mechanics

Teaching (graduate courses):
C*-algebras and their K-Theory

Academic Awards:
- 2016: Keck Foundation award
- 2011: CAREER award from the National Science Foundation.
- 2008: Cottrell award from the Research Corporation for Science Advancement.
- 2005-2007: Princeton Center for Complex Materials Postdoctoral Fellowship.
- 2000-2003: Robert A. Welch Foundation fellowship.
- 2000: Chuoke Award for graduate academic and research performance, Rice University.-1989: 6-th member of the Romanian team at the International Physics Olympiad.-1989: Bronze Medal at the Romanian National Physics Olympiad competition.

Referee services:
I review a substantial number of papers for a variety of journals: Physical Review Letters, Nano Letters, Physical Review B, Journal of Chemical Physics, Micro & Nano Letters, Jornal of the American Chemical Society, Journal of Physics: Condensed Matter, Optics Communications, Materials Chemistry and Physics, Journal of Mathematical Physics, Journal of Physics A: Mathematical and Theoretical, Mathematical Reviews, Communications in Mathematical Physics, Reviews in Mathematical Physics, Inventiones Mathematicae, Communications in Mathematical Sciences, Journal of Computational Physics, Archives of Rational Mechanics and Analysis, ESAIM: Control, Optimization and Calculus of Variations. I also review grant proposals from the National Science Foundation, Department of Energy and National Labs.

Memberships in professional associations:
- American Physical Society (APS) since 2000.
- Society for Industrial and Applied Mathematics (SIAM) since 2010.

Synergetics:
- organizer of the meetings called “Blackboard Lectures in Condensed Matter Physics.”
- I was Associate Editor for Topological Quantum Matter, an open access journal published by DeGruyter Open.

Invited talks:
2016
10 ‘The bulk-boundary principle for topological insulators,’ Mathematical Physics Seminar, CUNY Graduate Center, New York, October 2016.
9 ‘The tale of two extraordinary identities,’ talk for the conference “QMATH13: Mathematical results in quantum mechanics,” Georgia Tech (Atlanta, US), October 2016.
8 ‘A computational non-commutative geometry program,’ talk for the IGA/AMSI workshop “Topological matter, strings, K-theory, and related areas,” U. of Adelaide (Australia), September 2016.
7 ‘The Anderson localization-delocalization transition in IQHE and topological insulators,’

talk for the EMS-IMAP summer school in mathematical physics "Universality, Scaling Limits and Effective Theories," Roma (Italy), July 2016.

6 'Generalized Wannier functions,' talk for the SIAM meeting "Mathematical aspects of materials science," Philadelphia (USA), May 2016.

5 'Computing the response functions of disordered solids: An operator algebras approach,' talk for the SIAM meeting "Mathematical aspects of materials science," Philadelphia (USA), May 2016.

4 'Non-commutative geometry techniques for disordered topological insulators,' blackboard seminar for the program "Geometry of Quantum Hall States," Simons Center for Geometry and Physics, Stony Brook (USA), April 2016.

3 'Bulk-boundary principle for disordered topological insulators,' workshop on "Geometry of Quantum Hall States," Simons Center for Geometry and Physics, Stony Brook (USA), April 2016.

2 'Fitting the topological insulators in Alain Connes' noncommutative geometry program,' Informal Mathematical Physics Seminar run by Okounkov and Krichever, Columbia University, New York, March 2016.

1 'Topological Invariants: Why do we care and what we can do with them,' Colloquium for Physics Department, Seaton Hall University, South Orange NJ, Feb 2016.

2015

6 'Topological Mechanics,' Colloquium for Physics Department, Fordham University, New York, November 2015.

5 'On the Non-Commutative Geometry of Topological Insulators,' Colloquium for Mathematics Department, University of Erlangen-Nuernberg, Germany, October 2015.

4 'Bulk-Boundary Correspondence for Topological Insulators: From K-Theory to Physics to Devices,' International Workshop : Mathematical Approach to Topological Phases in Spintronics, Tohoku University, Sendai, Japan, Oct. 2015.

3 'Topological insulators at strong disorder,' XVIII International Congress on Mathematical Physics, Santiago de Chile, Chile, July 2015.

2 'Topological insulators at strong disorder,' weakly seminar at the Simons Center for Geometry and Physics, SUNY Stony Brook, June 2015.

1 'Bulk-Boundary Correspondence for the Complex Classes of Topological Insulators,' International Workshop: Mathematics of Novel Materials, Mittag-Leffler Institute, Stockholm, Sweden, June 2015.

2014

6 'C*-algebras for research and discovery in materials science,' Fluids and Wave Seminar, Mathematics Department, New Jersey Institute of Technology, Nov. 2014.

5 'Topological mechanics in the A and AIII symmetry classes,' International Workshop: Topological Mechanics, Lorentz Institute, Leiden University, Netherlands, Oct. 2014.

4 'The non-commutative geometry of the complex classes of topological insulators: Analysis and Simulations,' Erwin Schroedinger Institute, Vienna, August 2014.

3 'The non-commutative geometry of the complex classes of topological insulators,' Institute of Mathematics of the Romanian Academy, Bucharest, July 2014.

2 'Topological phases with chiral symmetry at strong disorder,' Condensed Matter Seminar, City College of New York , March 2014.

1 'An invitation to a computational non-commutative geometry program,' workshop on Topological Phases in Spintronics, AIMIR Sendai, Japan, February 2014.

2013

3 'The intriguing world of disordered topological insulators,' Physics Colloquium, Queens

College, Oct 2013.

2 'Topological Insulators: 8 years after,' Physics Colloquium, Yeshiva University, September 2013.

1 'Quantum Criticality in Graphene,' informal seminar organized by Kim Philip, Columbia University, February 2013.

2012

4 'Non-Commutative Calculus for condensed matter systems,' Institute for Condensed Matter Theory seminar, University of Illinois Urbana Champaign, Oct 2012.

3 'Topology of disordered condensed matter systems,' Condensed Matter Seminar, Rutgers University, Nov 2012.

2 'The methods of Non-Commutative Geometry for Condensed Matter Theorists,' The Blackboard Lectures in Condensed Matter Physics, Yeshiva University, June 2012.

1 'Effect of strong disorder in topological insulators,' Condensed Matter Seminar, Brookhaven National Lab, Feb 2012.

2011

2 'Analysis of the Kohn-Sham map for the electronic structure calculations,' workshop on Electronic Structure: Analysis and Simulations, Jiao Tong University, Shanghai, June 2011.

1 'First principle simulations of topological insulators: Fundamental challenges,' Banff International Research Station for Mathematical Innovation and Discovery, Jan 2011.

2010

3 'Modern theory of molecular tunneling transport,' SIAM Conference on Mathematical Aspects of Materials Science (MS10), May 2010.

2 'Topological insulators from a Non-Commutative Geometry perspective,' Cond. Mat. Seminar at Princeton University, May 2010.

1 'Topology and Non-Commutative Geometry in Modern Condensed Matter Research,' Cond. Mat. Seminar at City College of New York, March 2010.

2009

3 'Non-commutative calculus and quantization of ensemble averages,' Applied Mathematics Seminar, UC Santa Barbara, April. 2009.

2 'Modern theory of molecular tunneling transport,' Physics Colloquium, New Jersey Institute of Technology, Feb. 2009.

1 'Modern theory of molecular tunneling transport,' Physics Colloquium, California State University, Feb. 2009.

2008

3 'On the Mathematical Structure of the Kohn-Sham Self-Consistent Map,' Applied Mathematics Seminar, Princeton University, Nov. 2008.

2 'The mathematical structure of the Kohn-Sham equations,' Internal Seminars of the Institute for Mathematics and its Applications, University of Minnesota, Oct. 2008.

1 'Tunneling conductance of molecular wires,' 2008 Electronic Structure Workshop, Univ. of Illinois, Urbana-Campaign, June. 2008.

2007

10 'Transport characteristics of molecular chains,' Weinan E's DFT Meeting, Princeton, Oct. 2007.

9 'Complex Analytic Structure of the Bands in Periodic Molecular Chains,' CECAM Lyon, June 2007.

8 'Charge Transport in Molecular Chains,' Trieste Workshop to honor Roberto Car's 60th birthday, June 2007.

7 'Transport Characteristics of Molecular Wires,' Cond. Mat. Seminar, Rice University, March 2007.

6 'Transport Characteristics of Molecular Wires,' Physics Colloquium, Univ. of New Hampshire, Feb. 2007.

5 'Mapping the Braiding Properties of Non-Abelian Fractional Quantum Hall Liquids,' Physics Colloquium, Univ. of Washington St. Louis, Feb. 2007.

4 'DC conductance of molecular devices,' Physics Colloquium, Univ. of South Carolina, Feb. 2007.

3 'DC conductance of molecular devices,' Physics Colloquium, Louisville Univ., Feb. 2007.

2 'DC conductance of Long Molecular Wires,' Cond. Mat. Seminar, University of Missouri-Columbia, Jan. 2007.

1 'Mapping the Braiding Properties of Non-Abelian Fractional Quantum Hall Liquids,' Physics Colloquium, Yeshiva Univ., Jan. 2007.

2006

2 'The Analytic Structure of Bloch Functions,' Mathematical Physics Seminar, Princeton University, November 2006.

1 'Non-Equilibrium Dynamics of Electrons in Molecular Devices,' Physics Colloquium, New Jersey Inst. of Tech., Spring 2006.

2005

6 'New insight into the properties of periodic systems,' Physics Colloquium, New Jersey Inst. of Tech., Fall 2005.

5 'Periodic systems: New insight into their properties,' Cond. Mat. Seminar, Rice Univ., 2005.

4 'On the analytic structure of Bloch functions,' D. Vanderbilt's Seminar, Rutgers Univ., 2005.

3 'Nearsightedness of Electronic Matter: The basis for O(N) electronic structure calculations,' Cond. Mat. Seminar, Univ. of Southern California, 2005.

2 'Quantum mechanics with millions of atoms,' Physics Colloquium, Univ. of Texas, El Paso, 2005.

1 'Nearsightedness of Electronic Matter,' Lawrence Livermore National Lab, 2005.

2004

1 'Nearsightedness of Electronic Matter,' Physics Colloquium, California State Univ. Northridge, 2004.

Books:

1. E. Prodan and H. Schulz-Baldes, 'Bulk and Boundary Invariants for Complex Topological Insulators: From K-Theory to Physics,' (Mathematical Physics Studies, Springer, 2016) (http://link.springer.com/book/10.1007/978-3-319-29351-6)

Peer reviewed publications:

2016

6 J. Kanter, J. Song and E. Prodan, Transport properties of graphene in the presence of disorder and magnetic fields: A finite-temperature Kubo-formula investigation, in preparation.

5 E. Prodan, Topological insulators at strong disorder, invited paper for the 2015 Congress on Mathematical Physics.

4 E. Prodan and H. Schulz-Baldes, Generalized Connes-Chern characters in KK-theory with an application to weak topological invariants, under review by Reviews in Mathematical Physics.

3 E. Prodan, Intrinsic Connes-Chern characters for crossed product algebras, under review by Journal of Operator Theory (http://arxiv.org/abs/1501.03479)

2 E. Prodan and H. Schulz-Baldes, Non-commutative odd Chern numbers and topological phases of disordered chiral systems, J. Func. Anal. **271**, 1150–1176 (2016).

1 E. Prodan and J. Bellissard, Mapping the current-current correlation function near a quantum critical point, Annals of Physics **368**, 1-15 (2016).

2015

3 E. Prodan, On the generalized Wannier functions, J. Math. Phys. **56**, 113511 (2015).

2 J. Song and E. Prodan, Quantization of topological invariants under symmetry-breaking disorder, Phys. Rev. B **92**, 195119 (2015).

1 E. Prodan, Virtual topological insulators with real quantized physics, Phys. Rev. B. **91**, 245104 (2015).

2014

7 J. Song, C. Fine and E. Prodan, Effect of strong disorder in 3-dimensional chiral-symmetric topological insulators: Phase diagrams and maps of the bulk invariant, Phys. Rev. B **90**, 184201 (2014).

6 H. Zhang, V. Kulkarni, E. Prodan, P. Nordlander and A. O. Govorov, DFT theory of quantum plasmons resonances in doped semiconductor nanocrystals, J. Phys. Chem. C 118, 16035-16042 (2014).

5 S. R. Garcia, E. Prodan and M. Putinar, Mathematical and physical aspects of complex symmetric operators, J. Phys. A: Math. Theor. **47**, 353001 (2014).

4 E. Prodan, The Non-Nommutative Geometry of the complex classes of topological insulators, Topol. Quantum Matter **1**, 1-16 (2014).

3 I. Mondragon-Shem, J. Song, Taylor L. Hughes and E. Prodan, Topological criticality in the chiral-symmetric AIII class at strong disorder, Phys. Rev. Lett. **113**, 046802 (2014).

2 J. Song and E. Prodan, AIII and BDI topological systems at strong disorder, Phys. Rev. B **89**, 224203 (2014).

1 J. Song and E. Prodan, Characterization of the quantized Hall insulator phase in the quantum critical regime, Euro. Phys. Lett. **105**, 37001 (2014) [Selected as Editor's choice and in the Highlights of EPL for 2014].

2013

5 E. Prodan, Quantum transport in disordered systems under magnetic fields: A study based on operator algebras, Applied Mathematics Research eXpress Vol. 2013, 176–255 (2013).

4 E. Prodan, B. Leung and J. Bellissard, The non-commutative n-th Chern number, J. Phys. A: Math. Theor. **46**, 485202 (2013) [Selected among the Highlights of 2013].

3 V. Kulkarni, E. Prodan and P. Nordlander, Quantum Plasmonics: Optical Properties of a Nanomatryushka, Nano Lett. **13**, 5873-5879 (2013).

2 Y. Xue and E. Prodan, Quantum criticality at the Chern-to-normal insulator transition, Phys. Rev. B **87**, 115141 (2013).

1 B. Leung and E. Prodan, A non-commutative formula for the magneto-electric response, J. Phys. A: Math. Theor. **46**, 085205 (2013).

2012

3 Y. Xue and E. Prodan, The noncommutative Kubo-formula: Applications to Transport in Disordered Topological Insulators with and without Magnetic Fields, Phys. Rev. B **86**, 155445 (2012).

2 B. Leung and E. Prodan, Effect of strong disorder in a 3-dimensional topological insulator:

Phase diagram and maps of the Z2 invariant, Phys. Rev. B **85**, 205136 (2012).

1 Z. Xu, L. Sheng, D.Y. Xing, E. Prodan and D.N. Sheng, Topologically protected extended states in disordered Quantum spin-Hall systems without time-reversal symmetry, Phys. Rev. B 85, 075115 (2012).

2011

5 E. Prodan, Manifestly gauge independent formulations of the Z2 invariants, Phys. Rev. B **83**, 235115 (2011). (Editor's Suggestion)

4 T. L. Hughes, E. Prodan and B. A. Bernevig, Inversion symmetric topological insulators, Phys. Rev. B **83**, 245132 (2011).

3 E. Prodan, Three-dimensional phase diagram of disordered HgTe/CdTe quantum spin-Hall wells, Phys. Rev. B **83**, 195119 (2011). (Editor's Suggestion + Synopsis)

2 E. Prodan, Disordered topological insulators: A non-commutative geometry perspective, J. Phys. A: Math & Theor **44**, 113001 (2011). (Topical Review, highlighted on the cover of the journal)

1 N. Berg, K. Joel and M. Koolyk and E. Prodan, Topological phonon modes in filamentary structures, Phys. Rev. E **83**, 021913 (2011).

2010

5 E. Prodan, Raising the temperature on Density Functional Theory, Physics **3**, 99 (2010).

4 J. Zuloaga, E. Prodan and P. Nordlander, Quantum Plasmonics: Optical properties and tunability of metallic nanorods, ACS Nano **4**, 5269 (2010).

3 E. Prodan, T.L. Hughes and B.A. Bernevig, Entanglement spectrum of a disordered topological Chern insulator, Phys. Rev. Lett. **105**, 115501 (2010).

2 E. Prodan, Non-commutative tools for topological insulators, New J. Phys. **12**, 065003 (2010).

1 E. Prodan and A. LeVee, Tunneling devices with semi-conducting leads, Phys. Rev. B 81, 085307 (2010).

2009

8 E. Prodan and C. Prodan, Topological phonon modes and their role in dynamic instability of microtubules, Phys. Rev. Lett. **103**, 248101 (2009).

7 E. Prodan and F.D.M. Haldane, Mapping the braiding properties of the Moore-Read state, Phys. Rev. B **80**, 11512 (2009) [selected as Editor's Suggestion].

6 E. Prodan, Robustness of the Spin-Chern number, Phys. Rev. B **80**, 125327 (2009). [selected by Virtual J. Nanoscale Sci. & Techn.]

5 E. Prodan, The edge spectrum of Chern insulators with rough edges, J. Math. Phys. **50**, 083517 (2009).

4 E. Prodan and R. Car, Theory of tunneling transport in periodic chains, Phys. Rev. B **80**, 035124 (2009).

3 J. Zuloaga, E. Prodan and P. Nordlander, Quantum description of the plasmon resonances in a nanoparticle dimer, Nano Letters **9**, 887-891 (2009).

2 E. Prodan, An edge Index for the Quantum Spin Hall Effect, Journal of Phys. A: Math. Theor. **42** 082001 (2009) [Fast Track Communication].

1 E. Prodan, Topological quantization of ensemble averages, Journal of Phys. A: Math. Theor. **42**, 065207 (2009).

2008

3 E. Prodan, C. Prodan and J.H. Miller, The dielectric response of spherical live cells in suspension: An analytic solution, Biophysical Journal **95**, 4174 (2008).

2 J. Wang, E. Prodan, R. Car and A. Selloni, Band alignment in molecular devices: Influence of anchoring group and metal work function, Phys. Rev. B **77**, 245443 (2008) [selected by Virtual J. Nanoscale Sci. & Techn.]

1 E. Prodan and R. Car, Tunneling conductance of amine linked alkyl chains, Nano Letters **8**, 1771 (2008).

2007

1 E. Prodan and R. Car, DC Conductance of Molecular Wires, Phys. Rev. B **76**, 115102 (2007).

2006

3 E. Prodan, Nearsightedness of electronic matter in one dimension, Phys. Rev. B **73**, 085108 (2006).

2 E. Prodan, Analytic structure of Bloch functions for linear molecular chains, Phys. Rev. B **73**, 035128 (2006).

1 E. Prodan, R. Garcia and M. Putinar, Norm estimates of complex symmetric operators applied to quantum systems, J. Phys. A: Math. and Gen. **39**, 389-400 (2006).

2005

2 E. Prodan and W. Kohn, Nearsightedness of electronic matter, Proc. Natl. Acad. Sci. **102**, 11635-11638 (2005).

1 E. Prodan, Symmetry breaking in the self-consistent Kohn-Sham equations, J. Phys. A: Math. and Gen. **38**, 5647-5657 (2005).

2004

1 P. Nordlander and E. Prodan, Plasmon hybridization in nanoparticles near metallic surfaces, Nano Lett. **4**, 2209-2213 (2004).

2 P. Nordlander, C. Oubre, E. Prodan, K. Li and M.I. Stockman, Plasmon hybridization in nanoparticle dimers, Nano Lett. **4**, 899-903 (2004).

3 E. Prodan and P. Nordlander, Plasmon hybridization in spherical nanoparticles, J. Chem. Phys. **120**, 5444-5454 (2004).

2003

7 E. Prodan, C. Radloff, N.J. Halas and P. Nordlander, A hybridization model for the plasmon response of complex nanostructures, Science **302**, 419-422 (2003) [selected by Virtual J. Nanoscale Sci. & Techn.]

6 E. Prodan, P. Nordlander and N.J. Halas, Electronic structure and optical properties of gold nanoshells, Nano Lett. **3**, 1411-1415 (2003).

5 E. Prodan and P. Nordlander, Structural tunability of the plasmon resonances in metallic nanoshells, Nano Lett. **3**, 543-547 (2003).

4 E. Prodan, N.J. Halas and P. Nordlander, Effects of dielectric screening on the optical properties of metallic nanoshells, Chem. Phys. Lett. **368**, 94-101 (2003).

3 E. Prodan and P. Nordlander, On the Kohn-Sham equations with periodic background potentials, J. Stat. Phys. **111**, 967-992 (2003).

2 P. Nordlander and E. Prodan, Electronic structure and optical properties of metallic nanoshells, Proc. SPIE **5221**, 151-163 (2003).

1 E. Prodan: Theoretical investigations of the electronic structure and optical properties of metallic nanoshells, PhD Thesis, Rice University, (2003).

2002

3 E. Prodan, Allen Lee and P. Nordlander, The effect of a dielectric core and embedding medium on the polarizability of metallic nanoshells, Chem. Phys. Lett. **360**, 325-332 (2002).

2 E. Prodan and P. Nordlander, Electronic structure and polarizability of metallic nanoshells, Chem. Phys. Lett. **352**, 140-146 (2002).

1 P. Nordlander and E. Prodan, Optical properties of metallic nanoshells, Proc. SPIE **4810**, 91-98 (2002).

2001

4 E. Prodan and P. Nordlander, Exchange and correlations effects in small metallic nanoshells, Chem. Phys. Lett. **349**, 153-160 (2001).

3 E. Prodan and P. Nordlander, Hartree approximation I: The fixed point approach, J. Math. Phys. **42**, 3390-3406 (2001).

2 E. Prodan and P. Nordlander, Hartree approximation II: The thermodynamic limit, J. Math. Phys. **42**, 3407-3423 (2001).1 E. Prodan and P. Nordlander, Hartree approximation III: The symmetry breaking, J. Math. Phys. **42**, 3424-3438 (2001).

2000

5 J. H. Miller, C. Ordonez and E. Prodan, Time-Correlated Soliton Tunneling in Charge and Spin Density Waves, Phys. Rev. Lett. **84**, 1555-1558 (2000).

4 E. Prodan, Cluster Expansion: Explicit Estimates, J. Math. Phys. **41**, 787-804 (2000).

3 JH. Miller, E. Prodan, R.K. Chu and C. Ordonez, Time-correlated tunneling of solitons in charge and spin density waves, Physica C **341**, 763-764 (2000).

2 C. Prodan, J.R. Claycomb, E. Prodan and JH. Miller), High-Tc SQUID-based impedance spectroscopy of living cell suspensions, Physica C **341**, 2693-2694 (2000).

1 J.H. Miller, C. Ordonez and E. Prodan, Time-correlated macroscopic quantum tunneling of density wave solitons,å Physica B. **284**, 1898-1899 (2000).

1999

4 E. Prodan, Spontaneous Transitions in Quantum Mechanics, J. Phys. A: Math. and General **32**, 4877-4881 (1999).

3 E. Prodan, Transfer matrices for scalar fields on curved spaces, J. Math. Phys **40**, 1400-1405 (1999).

2 C. Prodan and E. Prodan, The Dielectric behavior of living cell suspensions, J. Phys. D: Applied Physics **32**, 335-343 (1999).

1 J.H. Miller, C. Ordonez and E. Prodan, Theory of time-correlated tunneling of density wave solitons, Journal de Physique IV. **9**, 171-173 (1999).

1998

1 E. Prodan, The Laplace-Beltrami operator on surfaces with axial symmetry, J. Phys. A: Mathematical and General **31**, 4289-4300, (1998).

1996

1 E. Prodan: The Laplace-Beltrami operator on closed, 2-dimensional Riemannian surfaces, Master Thesis, Univ. of Bucharest, (1996).

1995

1 E. Prodan: Topological analysis of the Gauge Fields, BS Thesis, Univ. of Bucharest, (1995).