EVDOKIYA (EVA) KOSTADINOVA

Curriculum Vitae

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EDUCATION

Ph.D., Dec 2017
Department of Physics
Baylor University

Dissertation: "Spectral Approach to Transport Problems in Two-Dimensional Disordered Lattices: Physical Interpretation and Applications"
Advisor: Dr. T W Hyde; Collaborators: Dr. L S Matthews, Dr. C D Liaw

B.S., May 2014
Department of Physics
Furman University

Thesis: "Sensors for Extraterrestrial Robot Land Navigation"
Advisor: Dr. D A Moffett; Collaborators: Dr. J R Conrad

B.A., May 2014
Dep. of Political Science
Furman University

Thesis: "Middle East and Islamic Studies Programs in the US in the Wake of the Arab Spring"
Advisor: Dr. A K Yildirim; Minor: Middle East and Islamic Studies

WORK EXPERIENCE

- Assistant Research Professor at CASPER, Baylor University, Feb 2018 – present
- Graduate Research Assistant at CASPER, Baylor University, May 2016 – Dec 2017
- Graduate Teaching Assistant at Baylor University Physics Department, Sep 2014 –May 2016
- Lab Assistant and Physics Tutor at Furman University Physics Department, Sep 2012 – May 2014
- Library Assistant in Inter Library Loan Department, Furman University, Sep 2010 – May 2014

GRANTS FUNDED

- [1] **PI:** NSF/DOE Onset of Turbulence in Dusty Plasma Liquids, Aug 1, 2019 – July 31, 2022
- **Co-PI:** NASA/JPL Dust charging and Transport in Simulated Lunar Swirl Environments, Dec 1, 2019 – Nov 30, 2020
- Co-PI: DOE-FES Hypervelocity impact in stellar media: heat shielding, formation of shock fronts and ablation clouds (allocated experimental time on DIII-D as part of the DOE 2020 Frontiers Experiments Program), Sept 1, 2020 – Aug 31, 2021
- Co-PI: DOE-FES Modeling Plasma Response to Non-Axisymmetric Magnetic Field Perturbations in Tokamak Boundaries, Sept 1, 2020 – Aug 31, 2022

RESEARCH EXPERIENCE

***Professional Research*:** Center for Astrophysics, Space Physics, and Engineering Research (CASPER), Baylor University, Feb 2018 – present

- Topics: turbulence and exotic transport behavior in disordered media, nonlocal interactions in strongly coupled systems, lunar dust mitigation and control, self-organization and stability of gravity and microgravity dusty plasmas, statistical mechanics and thermodynamics of driven-dissipative systems, dust particle techniques for plasma diagnostics, dusty plasma applications to fusion research

[1] Progress related to this grant can be found in the following website: http://myweb.ttu.edu/jopadget/grant.html

***Graduate Research*:** Department of Physics, Baylor University, Sep 2014-Dec 2017 (advisor: T W Hyde)

- Topics: Spectral approach to Anderson-type transport problems in two-dimensional infinite disordered systems (physical interpretation and application to quantum and classical systems); Long-range attractive forces in plasma crystals; Disorder-induced phase transitions in complex plasmas; Complex plasma graphene analogues;

***Undergraduate Research*:**

- Madison Plasma Dynamo Experiment (MPDX), Department of Physics, University of Wisconsin (Madison), May-July 2013 (advisor: Dr. C. Forest, post-doctorate advisor: Dr. C. Cooper); Role: Designed, constructed and programmed a motion control system for robotic insertion of sweep probe used in plasma environment.
- Independent Study on Space Robotics, Department of Physics, Furman University, January-May 2013 (advisor: Dr. J. Conrad); Role: Studied types of sensors used in robot land navigation in extraterrestrial conditions.
- Hydration Status of Collagen as Revealed by Raman Spectroscopy, Department of Physics, Furman University, Jun-Aug 2011 (advisor: Dr. D. Wang); Role: Investigated the capability of Raman spectroscopy in revealing the physiochemical status of collagen through analysis of bovine material samples (Sigma-Aldrich)

JOURNAL PUBLICATIONS AND BOOKS **Undergraduate student authors*

- **E G Kostadinova**, J L Padgett, C D Liaw, L S Matthews, & T W Hyde, (2020). Anomalous diffusion in semi-crystalline polymer structures. (submitted to *Journal of Physics A) arXiv preprint arXiv:2006.01068*.
- J L Padgett, **E G Kostadinova**, C D Liaw, K Busse*, L S Matthews, & T W Hyde (2020). Anomalous diffusion in one-dimensional disordered systems: a discrete fractional Laplacian method. *Journal of Physics A: Mathematical and Theoretical*, *53*(13), 135205.
- L S Matthews, **E G Kostadinova**, D Sanford*, TW Hyde, S Ashrafi, E Guay* (2020), Dust charging in dynamic ion wakes, *Phys. Plasmas, 27,* 023703 ***(Featured & Scilight)***
- **E G Kostadinova**, C D Liaw, A S Hering, A Cameron*, F Guyton*, L S Matthews, & T W Hyde (2019). Spectral approach to transport in a two-dimensional honeycomb lattice with substitutional disorder. *Physical Review B, 99*, 024115
- P Hartmann, J C Reyes, **E G Kostadinova**, L S Matthews, T W Hyde, R U Masheyeva, K N Dzhumagulova, T S Ramazanov, T Ott, H Kählert, M Bonitz, I Korolov, & Z Donkó (2019). Self-diffusion in two-dimensional quasi-magnetized rotating dusty plasmas. *Physical Review E, 99*, 013203
- **E G Kostadinova**, F Guyton*, A Cameron*, K Busse*, C D Liaw, L S Matthews, & T W Hyde (2018) Transport properties of disordered two-dimensional complex plasma crystal, *Contrib. Plasma Phys.*, 58 (2-3), 209–216.
- ***(book)* E G Kostadinova** (2018). Spectral Approach to Transport Problems in Two-Dimensional Disordered Lattices: Physical Interpretation and Applications. Springer
- **E G Kostadinova**, K Busse*, N Ellis*, J Padgett, C D Liaw, L S Matthews, & T W Hyde (2017). Delocalization in infinite disordered two-dimensional lattices of different geometry. *Physical Review B*, *96*(23), 235408.
- **E G Kostadinova**, C D Liaw, L S Matthews, & T W Hyde (2016). Physical interpretation of the spectral approach to delocalization in infinite disordered systems. *Materials Research Express*, *3*(12), 125904.

[2] WORK IN PROGRESS **Undergraduate student authors*

- J Carmona-Reyes, P Hartmann, T W Hyde, **E G Kostadinova**, M Lechuga*, L S Matthews, M Rosenberg, (2020). Ion-dust instabilities in microgravity dusty plasma liquids, to be submitted to *Physics of Plasmas*

[2] Updated status on these papers can be found on my website: https://sites.baylor.edu/eva_kostadinova/

- **E G Kostadinova,** J L Padgett, C D Liaw, L S Matthews, T W Hyde, Transport beyond eigenvalues: A Fractional Laplacian Spectral Approach, to be submitted to *Nat. Phys.*
- **E G Kostadinova**, J L Padgett, Spectral Approach to Semi-Classical Turbulence, to be submitted to *Phys. Rev. B*

CONFERENCE TALKS

- **E G Kostadinova**, D M Orlov, I Bykov, J Schmidt, G Herdrich, L S Matthews, & T W Hyde, "Small Grains, Hyper Impact: Frontier Science at the DIII-D Tokamak", *APS DPP*, remote conference, Nov 9-13, 2020
- **E G Kostadinova**, R Banka, J Padgett, C D Liaw, L S Matthews, & T W Hyde, "Semi-classical turbulence in a dusty plasma monolayer", *APS DPP*, remote conference, Nov 9-13, 2020
- **E G Kostadinova**, J Padgett, C D Liaw, L S Matthews, & T W Hyde, "Spectral Approach to Particle Transport in Turbulent Dusty Plasma", *APS DPP*, Ft. Lauderdale, FL, Oct 21-25, 2019
- **E G Kostadinova**, J Padgett, C D Liaw, P Hartmann, M Rosenberg, L S Matthews, & T W Hyde, "Plasma Kristall-4: Anomalous diffusion and vorticity in a multi-chain dusty plasma", *IEEE PPPS*, Orlando, FL, June 23-28, 2019
- **E G Kostadinova**, J Padgett, K Busse, C D Liaw, L S Matthews, & T W Hyde, "Anomalous diffusion in microgravity complex plasma cloud", *APS DPP*, Portland, OR, Nov 5-9, 2018
- **E G Kostadinova**, J Padgett, K Busse, C D Liaw, L S Matthews, & T W Hyde, "Anomalous diffusion in 1D dusty plasma structures: A fractional Laplacian model for strong correlations", *15th Dusty Plasma Workshop*, Baltimore, MD, May 29-June 1, 2018
- **E G Kostadinova**, C D Liaw, L S Matthews, & T W Hyde, "Lattice wave transport in a 2D complex plasma graphene analogue", *APS DPP*, Milwaukee, WI, Oct 23-27, 2017
- **E G Kostadinova**, C D Liaw, L S Matthews, & T W Hyde, "Transport properties of disordered 2D complex plasma crystal", *SCCS*, Kiel, Germany, Jul 30-Aug 4, 2017
- **E G Kostadinova**, C D Liaw, L S Matthews, & T W Hyde, "Spectral Approach to Anderson Localization in 2D Complex Plasma Crystal", *APS DPP*, San Jose, CA, Oct 31-Nov 4, 2016

POSTER PRESENTATIONS

- **E G Kostadinova**, M Lechuga, L S Matthews, & T W Hyde, "Ion-dust streaming instability in microgravity dusty plasma", *APS DPP*, Ft. Lauderdale, FL, Oct 21-25, 2019
- **E G Kostadinova**, K Busse, L S Matthews, & T W Hyde, "Dust chain formation in microgravity complex plasma", *APS DPP*, Portland, OR, Nov 5-9, 2018
- **E G Kostadinova**, K Busse, C D Liaw, L S Matthews, & T W Hyde, "Nematic transition in microgravity complex plasma liquid crystals", *15th Dusty Plasma Workshop*, Baltimore, MD, May 29-June 1, 2018
- **E G Kostadinova**, B Mayberry, V Strait, W Smith, "Conservation of Momentum: Parallel Plate Capacitor Experiment", *Fall Joint Zone Meeting of the AAPT and the SPS,* Furman, Greenville, SC, Oct 2013
- **E G Kostadinova**, A Sheppard, "Women in Physics: Lise Meitner", *Southeast Conference for Undergraduate Women in Physics*, University of Tennessee, Knoxville, TN, Jan 2012

PUBLIC SERVICE AND OUTREACH

- *(pending approval)* Program committee chair of the Fundamental Plasma Physics subcommittee for APS DPP, 2021
- Member of the APS DPP Executive Nominating Committee, 2020
- Lecturer for 2020 Introduction to Fusion Energy and Plasma Physics Course, as part of the Princeton Plasma Physics Lab Science Undergraduate Laboratory Internship (SULI) program
- Member of the Plasma Science Expo organization committee for APS DPP 2020
- Member of the APS DPP Public Information Committee for 2019 & 2020
- Member of APS DPP CPP cross-cutting group on workforce development, 2019-present

- Member of advisory board for Heliyon Physics
- Referee for CRC Press, Journal of Plasma Physics, IEEE Transactions on Plasma Science, Chaos, Physics of Plasmas
- Educator Present Your PhD initiative, presenting novel scientific work to students from 1st to 12th grade
- Physics mentor for CODE RED, Baylor academic event for High Ability High School Students
- Lecturer for Baylor University's physics department graduate and undergraduate colloquium, CASPER seminar, and Women in STEM speaker series, Baylor Physics Bowl (High School science competition)
- Workshop coordinator for APS DPP Conference, San Jose, CA, Oct 31-Nov 4, 2016
- Department Representative in Baylor Graduate Students Association, Sep 2014-May 2017
- Graduate School Mentor in Baylor Mentor-Mentee Program, Sep 2015-Dec 2017

HONORS AND AWARDS

- Springer Thesis outstanding PhD research award, 2017
- Baylor University Graduate School Fellowship, Aug 2014-Dec 2017
- Second place on Atmel Corporation National Robotics Competition at World Maker Faire, New York Hall of Science, Queens, NY, September 2012
- National Scholar Award from the National Society of High School Scholars, May 2011
- Dean's List – for students with GPA in the top 25% of their class, 2013, 2012, 2011, 2010

SCIENTIFIC ORGANIZATIONS AND SOCIETIES

- US Burning Plasma Organization, Jan 2020-present
- IEEE, July 2019-Present
- American Physical Society (APS), Division of Plasma Physics, Sep 2012-Present
- Society of Physics Students (SPS), Sep 2010-2014
- Association for Women in Mathematics, Sep 2016-2018
- National Society of High School Scholars (NSHSS), Honorable Member, May 2010-Present
- Sigma Pi Sigma Physics Honor Society, Honorable Member, Apr 2013-Present
- Pi Sigma Alpha Honor Society, Honorable Member, Jan 2014-Present