Dmitry Pushin

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Education:

MASSACHUSETTS INSTITUTE OF TECHNOLOGY **Cambridge, MA**
Ph.D. in Physics, November 2006
Thesis Dissertation: "Coherent Control of Neutron Interferometry"
Adviser: Prof. D. G. Cory

MOSCOW INSTITUTE OF PHYSICS AND TECHNOLOGY **Dolgoprudny, Russia/**
M.S. in Physics, *With Honors*, July 1997 **Chernogolovka, Russia**
Master thesis: "Study of electron transport along *c*-axis of single crystals TlBaCuO and YBaCuO"
Adviser: Prof. V. F. Gantmakher
B.S. in Physics, *Summa Cum Laude*, July 1995

Experience:

INSTITUTE FOR QUANTUM COMPUTATION, UNIVERSITY OF WATERLOO/ **Waterloo, ON/**
Associate Professor, May 2021 – present

INSTITUTE FOR QUANTUM COMPUTATION, UNIVERSITY OF WATERLOO/ **Waterloo, ON/**
Assistant Professor, May 2017 – May 2021

INSTITUTE FOR QUANTUM COMPUTATION, UNIVERSITY OF WATERLOO/ **Waterloo, ON/**
NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST) **Gaithersburg, MD**
Research Assistant Professor, September 2010 – April 2017

MASSACHUSETTS INSTITUTE OF TECHNOLOGY/ **Cambridge, MA/**
NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST) **Gaithersburg, MD**
Postdoctoral Associate with Prof. David G. Cory, November 2006 – September 2010
Ph.D. Student, September 1998 – November 2006

SWISS FEDERAL INSTITUTE OF PHYSICS AND TECHNOLOGY **Zurich, Switzerland**
Research Assistant with Prof. H.R. Ott, September 1997 – September 1998

MOSCOW INSTITUTE OF PHYSICS AND TECHNOLOGY/ **Dolgoprudny, Russia/**
INSTITUTE OF SOLID STATE PHYSICS **Chernogolovka, Russia**
Research Assistant with Prof. V.F. Gantmakher, September 1995 - August 1997

Publication list (68 Articles**):**

1. An, F.P., Andriamirado, M., Balantekin, A.B., Band, H.R., Bass, C.D., Bergeron, D.E., Berish, D., Bishai, M., Blyth, S., Bowden, N.S. and Bryan, C.D., including ***Pushin D.A.*** and Woolverton A. 2022. Joint Determination of Reactor Antineutrino Spectra from ^{235}U and ^{239}Pu Fission by Daya Bay and PROSPECT. *Phys. Rev. Lett.,* **128,** 081801
2. Sarenac, D., Silva, A.E., Kapahi, C., Thompson, B., Cory, D.G. and ***Pushin, D.A.***, 2020. Human psychophysical discrimination of spatially dependant Pancharatnam-Berry phases in optical spin-orbit states. *arXiv preprint arXiv:2010.09619*. (accepted to Scientific Reports)
3. Nahman-Lévesque, O., Sarenac, D., Cory, D.G., Heacock, B., Huber, M.G. and ***Pushin, D.A.***, 2022. Generalizing the quantum information model for dynamic diffraction. *Physical Review A*, *105*(2), p.022403.

4. Kapahi, C., Sarenac, D., Bleuel, M., Cory, D.G., Heacock, B., Henderson, M., Huber, M.G., Taminiau, I. and ***Pushin, D.A.***, 2021. Next-generation high transmission neutron optical devices utilizing micro-machined structures. *arXiv preprint arXiv:2112.13176*.
5. Henderson M.E., Bleuel M., Beare J., Cory D.G., Heacock B., Huber M.G., Luke G.M., Pula M., Sarenac D., Sharma S., Smith E.M., Zhernenkov K., ***Pushin D.A***. 2021. Skyrmion Alignment and Pinning Effects in a Disordered Multi-Phase Skyrmion Material Co8Zn8Mn4. *arXiv:2112.08669*
6. Heacock, B., Fujiie, T., Haun, R.W., Henins, A., Hirota, K., Hosobata, T., Huber, M.G., Kitaguchi, M., ***Pushin, D.A***., Shimizu, H. and Takeda, M., 2021. Pendellösung Interferometry Probes the Neutron Charge Radius, Lattice Dynamics, and Fifth Forces. *Science 373* 6560.
7. Henderson, M.E., Beare, J., Sharma, S., Bleuel, M., Clancy, P., Cory, D.G., Huber, M.G., Marjerrison, C.A., Pula, M., Sarenac, D., Smith, E.M., Zhernenkov, K., Luke, G.M., and ***Pushin D.A.*** 2021. Characterization of a Disordered Above Room Temperature Skyrmion Material Co8Zn8Mn4. *Materials, 14(16), 4689.*
8. M Andriamirado, AB Balantekin, HR Band, CD Bass, DE Bergeron, NS Bowden, CD Bryan, R Carr, T Classen, AJ Conant, G Deichert, A Delgado, MV Diwan, MJ Dolinski, A Erickson, BT Foust, JK Gaison, A Galindo-Uribari, CE Gilbert, C Grant, S Hans, AB Hansell, KM Heeger, B Heffron, DE Jaffe, S Jayakumar, X Ji, DC Jones, J Koblanski, P Kunkle, O Kyzylova, CE Lane, TJ Langford, J LaRosa, BR Littlejohn, X Lu, J Maricic, MP Mendenhall, AM Meyer, R Milincic, PE Mueller, HP Mumm, J Napolitano, R Neilson, JA Nikkel, S Nour, JL Palomino, ***DA Pushin***, X Qian, R Rosero, M Searles, PT Surukuchi, MA Tyra, RL Varner, D Venegas-Vargas, PB Weatherly, C White, J Wilhelmi, A Woolverton, M Yeh, C Zhang, X Zhang. 2021. PROSPECT-II Physics Opportunities. *arXiv:2107.03934.*
9. Andriamirado, M., Balantekin, A.B., Band, H.R., Bass, C.D., Bergeron, D.E., Berish, D., Bowden, N.S., Brodsky, J.P., Bryan, C.D., Classen, T. and Conant, A.J., including ***Pushin D.A.*** and Woolverton A. 2021. Improved short-baseline neutrino oscillation search and energy spectrum measurement with the PROSPECT experiment at HFIR. *Physical Review D*, *103*(3), p.032001.
10. Cameron, A.R., Cheng, S.W., Schwarz, S., Kapahi, C., Sarenac, D., Grabowecky, M., Cory, D.G., Jennewein, T., ***Pushin, D.A***. and Resch, K.J. 2021. Remote state preparation of single photon orbital angular momentum lattices. *Phys. Rev. A* **104**, L051701.
11. H Almazán, M Andriamirado, AB Balantekin, HR Band, CD Bass, DE Bergeron, L Bernard, A Blanchet, A Bonhomme, NS Bowden, CD Bryan, C Buck, T Classen, AJ Conant, G Deichert, P Sanchez, A Delgado, MV Diwan, MJ Dolinski, I El Atmani, A Erickson, BT Foust, JK Gaison, A Galindo-Uribarri, CE Gilbert, S Hans, AB Hansell, KM Heeger, B Heffron, DE Jaffe, S Jayakumar, X Ji, DC Jones, J Koblanski, O Kyzylova, L Labit, J Lamblin, CE Lane, TJ Langford, J LaRosa, A Letourneau, D Lhuillier, M Licciardi, M Lindner, BR Littlejohn, X Lu, J Maricic, T Materna, MP Mendenhall, AM Meyer, R Milincic, PE Mueller, HP Mumm, J Napolitano, R Neilson, JA Nikkel, S Nour, JL Palomino, H Pessard, ***DA Pushin***, X Qian, J-S Réal, J-S Ricol, C Roca, R Rogly, R Rosero, T Salagnac, V Savu, S Schoppmann, M Searles, V Sergeyeva, T Soldner, A Stutz, PT Surukuchi, MA Tyra, RL Varner, D Venegas-Vargas, M Vialat, PB Weatherly, C White, J Wilhelmi, A Woolverton, M Yeh, C Zhang, X Zhang, 2021. Joint Measurement of the ^{235}U Antineutrino Spectrum by Prospect and Stereo. *arXiv:2107.03371.*
12. Andriamirado, M., Balantekin, A.B., Band, H.R., Bass, C.D., Bergeron, D.E., Bowden, N.S., Bryan, C.D., Classen, T., Conant, A.J., Deichert, G. and Diwan, M.V., Dolinski, M. J., Erickson, A., Foust, B. T., Gaison, J. K., Galindo-Uribarri, A., Gilbert, C. E., Hans, S., Hansell, A. B., Heeger, K. M., Heffron, B., Jaffe, D. E., Jayakumar, S., Ji, X., Jones, D. C., Koblanski, J., Kyzylova, O., Lane, C. E., Langford, T. J., LaRosa, J., Littlejohn, B. R., Lu, X., Maricic, J., Mendenhall, M. P., Meyer, A. M., Milincic, R., Mueller, P. E., Mumm, H. P., Napolitano, J., Neilson, R., Nikkel, J. A., Nour, S., Palomino, J. L., ***Pushin, D. A.,*** Qian, X., Rosero, R., Surukuchi, P. T., Tyra, M. A., Varner, R. L. Venegas-Vargas, D., Weatherly, P. B., White, C., Wilhelmi, J., Woolverton, A., Yeh, M., Zhang, C., Zhang, X., Cappiello, C. V. 2021. Limits on Sub-GeV Dark Matter from the PROSPECT Reactor Antineutrino Experiment. *Phys. Rev. D* 104 (1), 012009.

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17. D Sarenac, C Kapahi, AE Silva, DG Cory, B Thompson, ***DA Pushin***. 2020. Direct discrimination of structured light by humans. *PNAS,* **117** (26) 14682-14687
18. AB Balantekin, HR Band, CD Bass, DE Bergeron, D Berish, NS Bowden, JP Brodsky, CD Bryan, T Classen, AJ Conant, G Deichert, MV Diwan, MJ Dolinski, A Erickson, BT Foust, JK Gaison, A Galindo-Uribarri, CE Gilbert, BT Hackett, S Hans, AB Hansell, KM Heeger, B Heffron, DE Jaffe, X Ji, DC Jones, O Kyzylova, CE Lane, TJ Langford, J LaRosa, BR Littlejohn, X Lu, J Maricic, MP Mendenhall, R Milincic, I Mitchell, PE Mueller, HP Mumm, J Napolitano, R Neilson, JA Nikkel, D Norcini, S Nour, JL Palomino-Gallo, ***DA Pushin***, X Qian, E Romero-Romero, R Rosero, PT Surukuchi, MA Tyra, RL Varner, C White, J Wilhelmi, A Woolverton, M Yeh, A Zhang, C Zhang, X Zhang, PROSPECT Collaboration. 2020. Nonfuel antineutrino contributions in the ORNL High Flux Isotope Reactor (HFIR). *Phys. Rev. C* **101**, 054605.
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20. R. Haun, F. E. Wietfeldt, M. Arif, M. G. Huber, T. C. Black, B. Heacock, ***D. A. Pushin***, C. B. Shahi, 2020. A Precision Measurement of the Neutron Scattering Length of He-4 Using Neutron Interferometry. *Phys. Rev. Lett.* **124**, 012501
21. J Ashenfelter, AB Balantekin, HR Band, CD Bass, DE Bergeron, D Berish, NS Bowden, JP Brodsky, CD Bryan, JJ Cherwinka, T Classen, AJ Conant, D Dean, G Deichert, MV Diwan, MJ Dolinski, A Erickson, M Febbraro, BT Foust, JK Gaison, A Galindo-Uribarri, CE Gilbert, BT Hackett, S Hans, AB Hansell, KM Heeger, J Insler, DE Jaffe, DC Jones, O Kyzylova, CE Lane, TJ Langford, J LaRosa, BR Littlejohn, X Lu, DA Martinez Caicedo, JT Matta, RD McKeown, MP Mendenhall, PE Mueller, HP Mumm, J Napolitano, R Neilson, JA Nikkel, D Norcini, S Nour, **DA Pushin**, X Qian, E Romero-Romero, R Rosero, D Sarenac, PT Surukuchi, AB Telles, MA Tyra, RL Varner, B Viren, C White, J Wilhelmi, T Wise, M Yeh, Y-R Yen, A Zhang, C Zhang, X Zhang. 2019. The radioactive source calibration system of the PROSPECT reactor antineutrino detector. *Nucl. Instrum. Methods Phys. Res., Sect. A* **944,** 162465.
22. Benjamin Heacock, Robert Haun, Katsuya Hirota, Takuya Hosobata, Michael G Huber, Michelle E Jamer, Masaaki Kitaguchi, ***Dmitry A Pushin***, Hirohiko Shimizu, Ivar Taminiau, Yutaka Yamagata, Tomoki Yamamoto, Albert R Young. 2019. Measurement and alleviation of subsurface damage in a thick-crystal neutron interferometer. *Acta. Cryst. A***75**, 833
23. TR Gentile, MG Huber, DD Koetke, M Peshkin, M Arif, T Dombeck, DS Hussey, DL Jacobson, P Nord, ***DA Pushin***, R Smither. 2019. Direct observation of neutron spin rotation in Bragg scattering due to the spin-orbit interaction in silicon. *Physical Review C* **100**, 034005
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Sarenac, PT Surukuchi, MA Tyra, RL Varner, B Viren, C White, J Wilhelmi, T Wise, M Yeh, Y-R Yen, A Zhang, C Zhang, X Zhang. 2019. A low mass optical grid for the PROSPECT reactor antineutrino detector. *Journal of Instrumentation* **14 (04)**, P04014

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26. B Heacock, D Sarenac, DG Cory, MG Huber, DS Hussey, C Kapahi, H Miao, H Wen, ***DA Pushin***. 2019. Angular alignment and fidelity of neutron phase-gratings for improved interferometer fringe visibility. AIP Advances
27. J Ashenfelter, AB Balantekin, HR Band, CD Bass, DE Bergeron, D Berish, NS Bowden, JP Brodsky, CD Bryan, JJ Cherwinka, T Classen, AJ Conant, AA Cox, D Davee, D Dean, G Deichert, MV Diwan, MJ Dolinski, A Erickson, M Febbraro, BT Foust, JK Gaison, A Galindo-Uribarri, CE Gilbert, KE Gilje, BT Hackett, S Hans, AB Hansell, KM Heeger, J Insler, DE Jaffe, X Ji, DC Jones, O Kyzylova, CE Lane, TJ Langford, J LaRosa, BR Littlejohn, X Lu, DA Martinez Caicedo, JT Matta, RD McKeown, MP Mendenhall, JM Minock, PE Mueller, HP Mumm, J Napolitano, R Neilson, JA Nikkel, D Norcini, S Nour, ***DA Pushin***, X Qian, E Romero-Romero, R Rosero, D Sarenac, PT Surukuchi, AB Telles, MA Tyra, RL Varner, B Viren, C White, J Wilhelmi, T Wise, M Yeh, Y-R Yen, A Zhang, C Zhang, X Zhang. 2019. Measurement of the Antineutrino Spectrum from ^{235}U Fission at HFIR with PROSPECT. *Phys. Rev. Lett.* **122***,* 251801
28. J Nsofini, D Sarenac, DG Cory, ***DA Pushin***. 2019. Coherence Optimization in Neutron Interferometry through Defocusing. *Physical Review A*, **99(4)**, 043614.
29. J Ashenfelter, AB Balantekin, HR Band, CD Bass, DE Bergeron, D Berish, LJ Bignell, NS Bowden, JP Brodsky, CD Bryan, C. Camilo Reyes, S Campos, JJ Cherwinka, T Classen, AJ Conant, D Davee, D Dean, G Deichert, R. Diaz Perez, MV Diwan, MJ Dolinski, A Erickson, M Febbraro, BT Foust, JK Gaison, A Galindo-Uribarri, CE Gilbert, BT Hackett, S Hans, AB Hansell, B Hayes,KM Heeger, J Insler, DE Jaffe, DC Jones, O Kyzylova, CE Lane, TJ Langford, J LaRosa, BR Littlejohn, X Lu, DA Martinez Caicedo, JT Matta, RD McKeown, MP Mendenhall, PE Mueller, HP Mumm, J Napolitano, R Neilson, JA Nikkel, D Norcini, S Nour, ***DA Pushin***, X Qian, E Romero-Romero, R Rosero, D Sarenac, PT Surukuchi, MA Tyra, RL Varner, B Viren, C White, J Wilhelmi, T Wise, M Yeh, Y-R Yen, A Zhang, C Zhang, X. Zhang. 2019. Lithium-loaded Liquid Scintillator Production for the PROSPECT experiment. *Journal of Instrumentation,* **14(03)***,* P03026
30. J Ashenfelter, AB Balantekin, C Baldenegro, HR Band, CD Bass, DE Bergeron, D Berish, LJ Bignell, NS Bowden, J Bricco, JP Brodsky, CD Bryan, A Bykadorova Telles, JJ Cherwinka, T Classen, K Commeford, AJ Conant, AA Cox, D Davee, D Dean, G Deichert, MV Diwan, MJ Dolinski, A Erickson, M Febbraro, BT Foust, JK Gaison, A Galindo-Uribarri, CE Gilbert, KE Gilje, A Glenn, BW Goddard, BT Hackett, K Han, S Hans, AB Hansell, KM Heeger, B Heffron, J Insler, DE Jaffe, X Ji, D Jones, K Koehler, O Kyzylova, CE Lane, TJ Langford, J LaRosa, BR Littlejohn, F Lopez, X Lu, DA Martinez Caicedo, J Matta, RD McKeown, MP Mendenhall, HJ Miller, JM Minock, PE Mueller, HP Mumm, J Napolitano, R Neilson, JA Nikkel, D Norcini, S Nour, DA Pushin, X Qian, E Romero-Romero, R Rosero, D Sarenac, BS Seilhan, R Sharma, PT Surukuchi, C Trinh, MA Tyra, RL Varner, B Viren, JM Wagner, W Wang, B White, C White, J Wilhelmi, T Wise, H Yao, M Yeh, YR Yen, A Zhang, C Zhang, X Zhang, M Zhao. 2019. The PROSPECT reactor antineutrino experiment. *Nucl. Instrum. Methods Phys. Res., Sect. A* **922,** 287-309
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Wagner, W Wang, B White, C White, J Wilhelmi, T Wise, H Yao, M Yeh, YR Yen, A Zhang, C Zhang, X Zhang, M Zhao. 2018. First search for short-baseline neutrino oscillations at HFIR with PROSPECT. *Phys. Rev. Lett.* **121**: 251802

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51. Huber MG, Arif M, Chen WC, Gentile TR, Hussey DS, Black TC, **Pushin DA**, Wietfeldt FE, Yang L. 2014. Neutron interferometric measurement of the scattering length difference between the triplet and singlet states of n- 3He. *Physical Review C* 90:064004
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53. Wood CJ, Abutaleb MO, Huber MG, Arif M, Cory DG, **Pushin DA**. 2014. Quantum correlations in a noisy neutron interferometer. *Physical Review A* 90:032315
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55. Abutaleb MO, **Pushin DA**, Huber MG, Majkrzak CF, Arif M, Cory DG. 2012. Design of remnant magnetization FeCoV films as compact, heatless neutron spin rotators. *Applied Physics Letters* 101:182404
56. **Pushin DA**, Huber MG, Arif M, Cory DG. 2011. Experimental Realization of Decoherence-Free Subspace in Neutron Interferometry. *Physical Review Letters* 107:150401
57. **Pushin DA**, Arif M, Cory DG. 2009. Decoherence-free neutron interferometry. *Physical Review A* 79:053635-1
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60. Huber MG, Wietfeldt FE, Gentile TR, Chen WC, Arif M, Hussey DA, **Pushin DA**, Yang L, Black T 2009. Precision measurement of the neutron-He-3 spin-dependent scattering length using neutron interferometry. *Nuclear Instruments & Methods in Physics Research, Section A (Accelerators, Spectrometers, Detectors and Associated Equipment)* 611:235

61. **Pushin DA**, Arif M, Huber MG, Cory DG. 2008. Measurements of the vertical coherence length in neutron interferometry. *Physical Review Letters* 100:250404-1
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63. **Pushin DA**, Arif M, Jacobson DL, Doe CK, Cory DG. 2006. Reciprocal space neutron imaging. *Physica B-Condensed Matter* 385-86:1402-4
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65. Paschen S, **Pushin D**, Schlatter M, Vonlanthen P, Ott HR, Young DP, Fisk Z. 2000. Electronic transport in Eu1-xCaxB6. *Physical Review B* 61:4174-80
66. Paschen S, **Pushin D**, Ott HR, Young DP, Fisk Z. 1999. Magnetism and electrical transport in Fe0.9TM0.1Si, TM = Co, Rh, Ru. *Physica B* 261:864-5
67. Moshopoulou EG, Hundley MF, Movshovich R, Thompson JD, Sarrao JL, Fisk Z, Felder E, Chernikov M, **Pushin D**, Ott HR. 1999. Structure and physical properties of the quaternary Remeika-phase compound Yb5Pt6In16Bi2. *Physical Review B* 60:4096-100
68. Gantmakher VF, **Pushin DA**, Shovkun DV, Tsydynzhapov GE, Kozeeva LP, Lavrov AN. 1997. Low-temperature resistivity of YBa2Cu3O6+x single crystals in the normal state. *Jetp Letters* 65:870-6

Conference Contributions/Seminars:

1) Pushin DA, "Applications of Structured Matter and Light Waves", *Physics Colloquium*, invited talk, University of Maryland, April 27, 2021
2) Pushin DA, "Structured Neutron Waves", invited talk, Caltech High Energy Physics Seminar, Califirnia Institute of Technology, Pasadena, CA,USA, February, 2020
3) Pushin DA, "Structured Neutron Waves", invited talk, University of Kentucky, Lexington, KY, USA, January, 2020
4) Pushin DA, "Structured Neutron Waves", invited talk, McMaster BIMR Seminar, McMaster University, Hamilton, ON, Canada, December, 2019
5) Pushin DA, "Structured waves: from neutrons to light", invited talk, QANSAS2019, Acra, India, November, 2019
6) Pushin DA, "Phase-grating moiré neutron interferometry", invited talk, XNPIG2019, Sendai, Japan, October, 2019
7) Pushin DA, "Structured Waves: From Matter to Light", invited talk, Heinz Maier-Leibnitz Zentrum, Munich, July, 2019
8) Pushin DA, "Phase Grating Neutron Interferometry", invited talk, 2nd Workshop on Matter-Wave Interferometry, Vienna, Austria, May, 2019
9) Pushin DA, "Structured neutron waves", invited talk, SPIE Photonics West OPTO, San Francisco, United States, February, 2019
10) Pushin DA, "Three Phase-Grating Moire Interferometer", invited talk, International Workshop on Particle Physics at Neutron Sources, Grenoble, France, 2018
11) Pushin DA, "Structured neutron waves from incoherent neutrons", invited talk, ACNS, College Park, United States, June, 2018
12) D. Sarenac, J. Nsofini, I. Hincks, P. Miguel, M. Huber, B. Heacock, M. Arif, C. W. Clark, and D. G. Cory. "Structured Waves: From Matter to Light", invited talk, Applications of Lasers for Sensing and Free Space Communications, Orlando, United States, 2018
13) Pushin DA, "The Quantum Neutron" , invited talk, IQC-China, Waterloo, Canada, 2018
14) Pushin DA, "The Quantum Neutron", invited talk, Université de Montréal, Montréal, Canada, November, 2017
15) Pushin DA, "Holography of Twisted Neutron Waves and their Spin-Orbit Coupling", *ICOAM 2017,* invited talk, Anacapri, Italy, September, 2017
16) Pushin DA, "Spin-Orbit States of Neutron Beams", *Photonic North 2017,* invited talk, Ottawa, Canada, June, 2017

17) Pushin DA, "Neutron Twisted Waves and their Spin-Orbit Coupling", *NEUWAVE-9*, invited talk, Gaithersburg, MD, June, 2017
18) Pushin DA, "Twisting Neutron Waves", *ISINN-25*, invited talk, Dubna, Russia, May, 2017
19) Pushin DA, "The Quantum Neutron", *Physics Colloquium*, invited talk, University of Hawaii at Manoa, HI, USA, April, 2017
20) Pushin DA, "The Quantum Neutron", *Physics Colloquium*, invited talk, Tulane University, November, 2016
21) Pushin DA, "The Quantum Neutron", *Physics Colloquium*, invited talk, Texas A&M University, October, 2016
22) Pushin DA, "Twisting Neutron Wave", *JQI Workshop on Matter-Wave Interferometry*, invited talk, College Park, MD, USA, September, 2016
23) Pushin DA, "The Quantum Neutron", *Physics Colloquium*, invited talk, IQC, September, 2016
24) Pushin DA, Huber MG, Hussey DS, Jacobson D, LaManna J, Miao H, Sarenac D, Wen H, "Phase-grating interferometer for thermal and cold neutrons", *American Conference on Neutron Scattering,* Long Beach, CA, July, 2016
25) Pushin DA, "The Quantum Neutron", *Physics Colloquium*, invited talk, The Johns Hopkins University Applied Physics Laboratory, May, 2016
26) Pushin DA, "Neutron Limit on the Strongly-Coupled Chameleon Field", *APS April Meeting,* invited talk, Salt Lake City, UT, April, 2016
27) Pushin DA, "Twisting Neutron Waves", *APS March Meeting,* invited talk, Baltimore, Maryland, March, 2016
28) Pushin DA, "Neutron Interferometry and Quantum Information Science", *Physics Colloquium*, invited talk, University of Maryland, February 16, 2016
29) Pushin DA, "Twisting Neutron Waves", *11th The International Symposium on Characterization of Metals and Nanostructured Materials by Neutron and X-ray Synchrotron Scattering (NeXS 2015)* invited talk, Daejeon, South Korea, October 29, 2015
30) Pushin DA, "Neutron Interferometry and Quantum Information Science", *Physics Colloquium*, invited talk, Hamilton College, October 5, 2015
31) Pushin DA, "Quantum Correlations in a Noisy Neutron Interferometer", invited talk, *2015 AAAS Annual Meeting*, 12-16 February, 2015
32) Pushin DA, "Neutron Interferometry and Coherence", *IQUISE Lunch Seminar Series,* invited talk, MIT, Cambridge, MA, October 30, 2014
33) Saggu P, Jacobson DL, Hussey DS, Pushin DA, Baltic E, and Arif M, "Using Micro-channel Plates to Achieve Both High Spatial and Temporal Resolution in Neutron Radiography", *10th World Conference on Neutron Radiography*, Grindelwald, Switzerland, October 2014
34) Pushin DA, "Neutron Interferometry and Coherence", *Radiation Physics Seminar*, invited talk, NIST, Gaithersburg, MD, June, 2014
35) Pushin DA, "Neutron Interferometry at NIST", *GRANIT-2014 Workshop*, invited talk, Ecole de Physique des Houches, France, March, 2014
36) Pushin DA, "Coherent Control of Neutron Interferometer", *Physics and Astronomy Colloquium*, invited talk, University of Waterloo, Waterloo, Canada, November 2013
37) Pushin DA, Huber MG, Arif M, Cory DG, "Quantum Information and Neutron Interferometry", *BIT's 3rd Annual World Congress of Nano-S&T,* Xi'an, China, September 2013
38) Pushin DA, Wood C, Cory DG, Huber MG, "Neutron Interferometry and Quantum Coherence", *International Workshop on Neutron Optics and Detectors*, Munich, Germany, July 2013
39) Pushin DA, Huber MG, Arif M, Shahi CB, "Decoherence-Free Subspace in Neutron interferometry", invited talk, Atominstitut der Oesterreichischen Universitaeten, TU-Wien, Venna, Austria 2012
40) Pushin DA, Huber MG, Arif M, Shahi CB, "Neutron interferometry", invited talk, Max-Planck-Institut für Physik, München, May 2012

41) Pushin DA, Huber MG, Jacobson DL, Arif M, Black TC, Shahi CB, Abutaleb MO, Wietfeldt FE, "Neutron interferometric precision measurement of the n-4He scattering length" *8th International Workshop "Ultra Cold & Cold Neutrons. Physics & Sources,* June 2011
42) Pushin DA, Huber MG, Arif M, M. Abutaleb M, Clark CW, Cory DG. "Decoherence Free Neutron Interferometery" *APS March Meeting*, Dallas, Texas, US, March 2011
43) Pushin DA, "Neutron Interferometry", Chemistry and Biochemistry Seminar, invited talk, University of Maryland, College Park, MD, USA, December, 2010
44) Pushin DA, "Coherent Control of Neutron Interferometry", invited talk, *American Conference on Neutron Scattering*, Ottawa, ON, Canada, June 2010
45) Pushin DA, Huber MG, Arif M, Cory DG. "Decoherence Free Neutron Interferometery" *International Workshop on Neutron Optics*, Alpe d'Huez, France, March 2010
46) Pushin DA, Huber MG, Arif M, Cory DG. "Decoherence Free Neutron Interferometery" *APS March Meeting*, Portland, Oregon, US, March 2010
47) Pushin DA, Huber MG, Arif M, Cory DG. "Decoherence Free Neutron Interferometery" *APS April Meeting*, Washington, DC, US, February 2010
48) Huber MG, Arif M, Black TC, Chen WC, Gentile TR, Hussey DS, Pushin DA, Wietfeldt FE, Yang L "Neutron interferometric precision measurement of the n-^{3}He incoherent scattering length" *APS April Meeting*, Washington, DC, US, February 2010
49) Gentile TR, Arif M, Black TC, Chen WC, Huber MG, Hussey DS, Pushin DA, Wietfeldt FE, Yang L "Precision neutron polarimetry for a measurement of the n-^{3}He incoherent scattering length of ^{3}He" *APS April Meeting*, Washington, DC, US, February 2010
50) D. A. Pushin, M. Arif, D. L. Jacobson, M. G. Huber, Changwoo K. Doe, D. G. Cory, "Reciprocal Space Neutron Imaging" *2008 International Workshop on Neutron Imaging & Performance Evaluation Technology for a Fuel Cell*, invited talk, Yuseong, Daejon, Republic of Korea, September 2008
51) D. A. Pushin, M. Arif, D. L. Jacobson, M. G. Huber, Changwoo K. Doe, D. G. Cory, "Reciprocal Space Neutron Imaging" *2007 International Workshop on Neutron Imaging & Performance Evaluation Technology for a Fuel Cell*, invited talk, Yuseong, Daejon, Republic of Korea, May 2007
52) D. A. Pushin, M. Arif, D. L. Jacobson, Changwoo K. Doe, D. G. Cory "Reciprocal Space Neutron Imaging" *8th World Conference on Neutron Radiography,* Gaithersburg, MD, USA, October 2006
53) D. A. Pushin, M. Arif, D. L. Jacobson, Changwoo K. Doe, D. G. Cory "Reciprocal Space Neutron Imaging" *International Conference on Neutron Scattering*, Sydney, Australia, November 2005
54) D. A. Pushin, M. Arif, D. L. Jacobson, D. G. Cory "Neutron Interferometry" *MIT Nuclear Science and Engineering and Tokyo Tech Students Technical Poster Session*, Cambridge, USA, November 2005
55) T. Dombeck, H. Kaiser, M. Huber, D. Pushin, D. Hussey, D.Jacobson, R.Smither, D. Koetke "Demonstration of Thousands of Successive Bragg Reflections from a Perfect Silicon Crystal and Its Application in the Search for the Neutron EDM" *Second Joint Meeting of the American and Japanese Physical Societies*, Maui, Hawaii, September, 2005
56) D. A. Pushin, M. Brodsky, R. Ashoory, "Order and disorder transition in double quantum dots" *International School of Solid State Physics*, Erice, Sicily, July 2002
57) M. Brodsky, D. Pushin, N. Zhitinev, R. Ashoory, "Double quantum dots" *Physics Graduate Student Poster Session*, Cambridge, USA, March 1999

Patents:

- Sarenac, D., Cory, D.G., **Pushin, D.A.**, Nsofini, J. and Hincks, I., Quantum Valley Investment Fund LP, 2020. Generating a lattice of optical spin-orbit beams. U.S. Patent 10,782,464.
- David G. Cory, Joachim Nsofini, Dusan Sarenac and **Dmitry A. Pushin**, 2016. Spin-Orbit States of Neutron Wave Packets. *U.S. Patent Application 15/277,190*, filed September 27, 2016. *Issued: February 26, 2019, Patent No. 10,215,715*

Applications:

- Dusan Sarenac, Connor Kapahi, David G. Cory and **Dmitry A. Pushin**, 2019. Preparing Geometrical Phases and Quantum States for Human Observation. *U.S. Patent Application 62/804,883,* filed February 13, 2019.
- Dusan Sarenac, Connor Kapahi, **Dmitry A. Pushin**, and David G. Cory, 2019. Collimator System. *U.S. Patent Application 62/796,377,* filed January 24, 2019.

Recognitions/Awards:

1. NIST Distinguished Associate Award, 2019
2. 2018 Science Prize of the Neutron Scattering Society of America.
   "For the invention and application, in particular to neutron holography, of the five blade, decoherence-free interferometer." 2018
3. Our work was featured in Physics (The American Physical Society) as "Viewpoint: Moiré Effect Could Enhance Neutron Interferometry". Also our article in Physical Review Letters was an editor's suggestion. 2018
4. American Physical Society Top Ten Physics Newsmakers of 2016
5. *Nature News and Views*. Nuclear physics: Neutrons with a twist

Broadcast Interviews:

- Neutron holograms image the interiors of objects, 2016, *PhysicsWorld.com*
- Neutron Orbital Angular Momentum, 2015, *Nature News and Views, Nature.com*
- How to put neutrons into a twist, 2015. *PhysicsWorld.com*

Teaching Experience:

UNIVERSITY OF WATERLOO and INSTITUTE FOR QUANTUM COMPUTING, Waterloo, ON

1. MNS 410 (1221), undergrad. level, "Special Topics in Solid State Materials", **Winter 2022**
2. PHYS 437A,B (1219) undergrad level. "Research Projects", **Fall 2021**
3. PHYS 704 (1219), grad. level, "Statistical Mechanics I", **Fall 2021**
4. PHYS 704 (1209), grad. level, "Statistical Mechanics I", **Fall 2020**
5. PHYS 704 (1199), grad. level, "Statistical Mechanics I", **Fall 2019**
6. PHYS 768 (8366), grad. level, "Matter wave optics and Interferometry", **Fall 2019**
7. MNS 410 (1191), undergrad. level, "Special Topics in Solid State Materials", **Winter 2019**
8. PHYS 704 (1189), grad. level, "Statistical Mechanics I", **Fall 2018**
9. PHYS 768 (8366), grad. level, "Building Neutron Camera", **Winter 2014**
10. PHYS 777 (8188), grad. level, "Applied Neutron Science and Engineering", **Winter 2013**

University of Waterloo and National Institute of Standards and Technology, Gaithersburg, MD, USA
Organizer of "**CREAT Summer School**", **Summer 2014**
The Natural Sciences and Engineering Research Council of Canada (NSERC) Collaborative Research and Training Experience (CREATE) Program supports the training of teams of students and postdoctoral fellows through the development of innovative training programs, such as the use and development of Quantum Information Processing (QIP) and neutron methods.

UNIVERSITY OF MARYLAND, College Park, MD, USA
CHPH618A, grad. level, "Neutron Optics and Interferometry", **Winter 2014**

MASSACHUSETTS INSTITUTE OF TECHNOLOGY **Cambridge, MA**
Helped to teach "Nuclear Systems Design Project" (22.033), **Spring 2006**
(Students won an award for the best design at the American Nuclear Society Design Competition for their project "Design for a Compact Neutron Interferometer".)

Teaching assistant, Quantum physics (undergraduate level), **Spring 2002**

SWISS FEDERAL INSTITUTE OF PHYSICS AND TECHNOLOGY **Zurich, Switzerland**
Teaching assistant, Experimental physics techniques (undergraduate level), **Spring 1998**

Supervisory Experience:

Postdoctoral Associates:

1. Huseyin Ekinci (University of Waterloo, 2019-2022)
2. Mona Mirzaeimoghri (University of Waterloo/NIST, 2018 – 2019, now at NASA Goddard Space Flight Center)
3. Taisiya Mineeva (University of Waterloo/NIST, 2014 – 2017, now at Universidad Tecnica Federico Santa Marıa)

Graduate Students:

1. Melissa Henderson (University of Waterloo, 2018 – present)
2. Oliver Nahman-Levesque (University of Waterloo, 2018 – present)
3. Austin Woolverton (University of Waterloo, 2018 – 2021, MS, researcher at UW)
4. Connor Kapahi (University of Waterloo, 2018 – present)
5. Thomas Alexander (University of Waterloo, 2014 – 2018, now at IBM)

Undergraduate Students:

1. Alex Wen (UBC) Summer 2021, accepted to Caltech, Harvard, Cornell, UW
2. Roger Serrat (Universitat Politecnica de Caralunya), Winter 2021, thesis work. Now at ETH

COOP:

1. Andrew Cox (University of Waterloo, 2017, 2018, 2019, now a graduate student at University of Toronto)
2. Parminder Saggu (University of Waterloo/NIST, 2014)
3. Dusan Sarenac (University of Waterloo/NIST, 2013, graduated 2014, TQT technical lead at University of Waterloo)
4. Yousseph Helwa (University of Waterloo/NIST, 2013, graduated 2014, company owner)

Funding:

Current:

1. CCS/CIHR/BC Spark Grants, 2020, CAD$122,000
2. New Frontiers in Research Fund 2019 Exploration, CAD$250,000
3. TQT fund for 4 graduate students and 2 postdoctoral fellows.
4. NSERC Discovery Grant, individual, collaboration, CAD$120,000

Past:

1. Foundational Questions Institute (FQXi) entitled “Fundamental Tests of the Structure of Quantum Information with Neutron Interferometry”, collaboration, US$163,128
2. NSERC Discovery Grant, individual, collaboration, CAD$115,000
3. NSERC CREATE Program on Neutron Science and Engineering of Functional Materials, collaboration, CAD$1,650,000 (https://uwaterloo.ca/institute-for-quantum-computing/programs/neutron-create)

Event Administration:

1. 2016 Workshop Organizer, Joint Quantum Institute Workshop on Matter-Wave Interferometry
2. 2014 Organizer of CREATE summer school

Organizational Review Activities:

1. Reviewer of scientific proposals for NSF

2. Reviewer of scientific proposals for Japan Proton Accelerator Research Complex

Committee Memberships:

1. IQC scholarship committee (2017-2021)
2. Physics and Astronomy Communications Committee (2018-2021)
3. IQC safety committee (2019-2020)
4. IQC lab-restart committee (COVID-19) (2020)
5. HeForShe Science Faculty Advocate (2020-now)
6. IQC Building Committee (2021 – now)
7. IQC visiting committee (2021 – now)
8. Physics and Astronomy Undergraduate Experience (2021 – now)
9. Physics and Astronomy Graduate (2021 – now)
10. Physics and Astronomy Research and Awards (2021 – now)
11. Science Faculty Council (2021 – now)
12. Physics and Astronomy Ph.D. Defense Chair (2021 – now)

Referee:

1) Physical Review Letters
2) Nature Physics
3) Physical Review A
4) Applied Physics Letters
5) Nuclear Instruments and Methods
6) New Journal of Physics
7) Nature Communication
8) MDPI

Language skills:

Fluent in English and Russian, familiar with German