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📄 <https://kristinarusimova.github.io>

# Dr Kristina Rusimova

## Research Experience

- 2021– **Lecturer**, *Department of Physics*, University of Bath.
- 2018–2021 **Prize Fellow**, *Department of Physics*, University of Bath.
- 2017–2018 **Research Associate**, *Centre for Photonics and Photonic Materials*, University of Bath.
- 2012–2016 **PhD Research Student**, *Centre for Nanoscience and Nanotechnology*, University of Bath.
- 2016 **Visiting PhD Student (6 months)**, *School of Physics and Astronomy*, University of Birmingham.

## Education

- 2012–2016 **Doctor of Philosophy, Physics**, *University of Bath*.
- 2008–2012 **Master in Science, Physics with Nanotechnology**, *University of Birmingham*, *First Class with Honours (79%)*.

## Honours & Awards

- Faraday Division Horizon Prize, Royal Society of Chemistry, 2022
- Acad. Emil Djakov Prize, Institute of Electronics, Bulgarian Academy of Sciences, 2019
- Eureka: Science in Bath First Place Poster Prize, University of Bath, 2018.
- Prize Fellowship, University of Bath, 2018
- Department of Physics Postgraduate Poster Afternoon First Place Poster Prize, University of Bath, 2016
- University Research Studentship (PhD Funding), University of Bath, 2012
- School of Physics and Astronomy Summer Studentships, University of Birmingham, 2010 & 2011
- School of Physics and Astronomy Award, University of Birmingham, 2009

## Research Income

- £70,000: **K. R. Rusimova**, Royal Society, 01/04/2023 - 30/06/2024
- £317,495: P. J. Mosley, J. C. Knight & **K. R. Rusimova**, BT, 01/03/2022 - 31/08/2023
- £199,997: P. J. Mosley, & **K. R. Rusimova**, Hollow-core fibre cells for quantum memory, Innovate UK, 01/02/2022 - 31/07/2023
- £520,385: P. J. Mosley, T. Birks & **K. R. Rusimova**, Quantum Data Centre of the Future, Innovate UK, 01/03/2022 - 28/02/2025
- £106,605: V. K. Valev, & **K. R. Rusimova**, TRANSMUTING GOLD INTO AURIDES FOR

ALKali Metal Magnetometry: ALKEMMY, EPSRC UK Quantum Technology Hub “Networked Quantum Information Technologies”, 01/01/2021 - 30/06/2022

## Postdoctoral researchers

Paramita Pal, 2023 –  
Cameron McGarry, 2022 –

## PhD students

Pieter Keenan, 2022 –  
Will Smith, 2021 –  
Dewan Chowdhury, 2018-2022

## Project Supervision

### Master's projects

Thomas Coates-Evans and Shean Ong, 2022  
Louis Remington and Jamie Greenwood, 2021  
Danel Gomez Iradi, 2021  
Riley Shurvinton, 2018

### Bachelor's projects

Jaiya Keohane, 2022  
Sanjana Vinta, 2022  
Elliot Heeley, 2022

## Other mentorship experience at Bath

First year tutorials, 2022–  
PhD Candidate Confirmation Vivas: Robbie Mears

## Teaching experience

Lecturer, University of Bath:

- PH10002/52, Properties of Matter, First Semester 2021-2023
- PH30077, Electromagnetism 2, Second Semester 2023–
- PH20105, Experimental Physics and Computing 2, 2020–

## Publications

- 18 *Dense Arrays of Nanohelices: Raman Scattering from Achiral Molecules Reveals the Near-field Enhancements at Chiral Metasurfaces*, Robin R Jones, Cornelia Miksch, Hyunah Kwon, Coosje Pothoven, **K. R. Rusimova**, Maarten Kamp, Kedong Gong, Liwu Zhang, Tim Batten, Brian Smith, Alejandro V Silhanek, Peer Fischer, Daniel Wolverson, Ventsislav K Valev, **Advanced Materials**, 2209282, (2023).
- 17 *A self-consistent model to link surface electronic band structure to the voltage dependence of hot electron induced molecular nanoprobe experiments*, P. A. Sloan, and **K. R. Rusimova**, **Nanoscale Advances**, 4, 4880-4885 (2022).
- 16 *Modifying light-matter interactions with perovskite nanocrystals inside anti-resonant photonic crystal fiber*, A. Machnev, A. Pushkarev, P. Tonkaev, R. E. Noskov, **K. R. Rusimova**, P. J. Mosley, S. V. Makarov, P. B. Ginzburg, and I. I. Shishkin **Photonics Research**, 9(8), 1462-1469 (2021).
- 15 *Birefringent antiresonant hollow-core fibre*, S. Yerolatsitis, R. Shurvinton, P. Song, Y. Zhang, R. J. A. Francis-Jones, and **K. R. Rusimova**, **Journal of Lightwave Technology**, 38(18), 5157-5162 (2020). arXiv:1910.01906
- 14 *'Hot' in Plasmonics: Temperature-related Concepts and Applications of Metal Nanostructures*, C. Kuppe, **K. R. Rusimova**, L. Ohnoutek, D. Slavov, and V. K. Valev, **Advanced Optical Materials**, 8(1), 1901166 (2020)
- 13 *The nanometer limits of ballistic and diffusive hot-hole mediated nonlocal molecular manipulation*, H. G. Etheridge, **K. R. Rusimova**, and P. A. Sloan, **Nanotechnology**, 31(10), 105401 (2019)
- 12 *Passive, broadband and low-frequency suppression of laser amplitude noise to the shot-noise limit using hollow-core fibre*, E. J. Allen, G. Ferranti, **K. R. Rusimova**, J. A. Francis-Jones, M. Azini, D. Mahler, T. C. Ralph, P. J. Mosley, and J. Matthews, **Physical Review Applied**, 12, 044073, (2019) arXiv:1903.12598
- 11 *Common Source of Light Emission and Nonlocal Molecular Manipulation on the Si (111)-7×7 Surface*, R. M. Purkiss, H. G. Etheridge, P. A. Sloan, and **K. R. Rusimova**, **Journal of Physics Communications**, 3(9), 095010 (2019)
- 10 *Birefringent antiresonant hollow-core fibre*, S. Yerolatsitis, R. Shurvinton, P. Song, R. J. A. Francis-Jones, and **K. R. Rusimova**, *Proceedings of European Conference on Optical Communication*, Tu2E3 (2019)
- 9 *185 nm guidance in a hollow core antiresonant optical fibre*, B. Winter, D. Vorobiev, B. Fleming, E. Witt, W. Gilliam, **K. R. Rusimova**, S. Yerolatsitis, T. A. Birks, and W. J. Wadsworth, *Frontiers in Optics and Laser Science*, JTu3A.19 (2019)
- 8 *Atomic dispensers: thermoplasmonic control of alkali vapor pressure for quantum optical applications*, **K. R. Rusimova**, D. Slavov, F. Pradaux-Caggiano, J. T. Colling, S. N. Gordeev, D. R. Carbery, W. J. Wadsworth, P. J. Mosley, and V. K. Valev, **Nature Communications**, 10, 2328 (2019)
- 7 *First observation of hyper-Rayleigh scattering optical activity*, J. T. Collins, **K. R. Rusimova**, D. Hooper, L. Ohnoutek, H. H. Jeong, F. Pradaux-Caggiano, D. R. Carbery, T. Verbiest, P. Fischer, and V. K. Valev, **Physical Review X**, 9, 011024 (2019)
- 6 *Regulating the femtosecond excited-state lifetime of a single molecule*, **K. R. Rusimova**, R. M. Purkiss, R. Howes, F. Lee, S. Crampin, and P. A. Sloan, **Science**, 361 (6406), 1012-1016 (2018)
- 5 *Low-frequency suppression of classical laser fluctuations using a hollow-core fibre*, E. Allan, G. Ferranti, D. Mahler, **K. R. Rusimova**, P. J. Mosley, J. Matthews, *CLEO: Science and Innovations*, SF1K.7 (2018)

- 4 *Nonlocal manipulation with the scanning tunnelling microscope*, **K. R. Rusimova**, and P. A. Sloan, *Elsevier Encyclopedia of Interfacial Chemistry: Surface Science and Electrochemistry* (2017)
- 3 *Molecular and atomic manipulation mediated by electronic excitation of the underlying Si(111)-7×7 surface*, **K. R. Rusimova**, and P. A. Sloan, ***Nanotechnology: Special Issue***, 28, 054002 (2017)
- 2 *Initiating and imaging the coherent surface dynamics of charge carriers in real space*, **K. R. Rusimova**, N. Bannister, P. Harrison, D. Lock, S. Crampin, R. E. Palmer, and P. A. Sloan, ***Nature Communications***, 7, 12839 (2016)
- 1 *Atomically resolved real-space imaging of hot electron dynamics*, D. Lock, **K. R. Rusimova**, T. L. Pan, R. E. Palmer, and P. A. Sloan, ***Nature Communications***, 6, 8365 (2015)

#### Patent

- V. K. Valev, D. Slavov, **K. R. Rusimova**, W. J. Wadsworth, and P. J. Mosley, "Nanoparticle coatings for alkali-metal vapour containers", IP2423.1GB, filed 13/11/2018, US Patent App. 17/293, 898

### Conference Talks

#### Invited Talks

- 2023 **Shining light on single molecule dynamics at surfaces**, *Vice Chancellor's Research Day*, Bath, UK.
- 2022 **Hollow core fibres for alkali vapour spectroscopy**, *Second Joint Bath-TAU workshop*, Tel Aviv, Israel.
- 2021 **Thermal and non-thermal mechanisms of hot electron chemistry**, *Smart Nanomaterials 2021*, Paris, France.
- 2020 **Towards light-matter interactions on the atomic scale**, *Virtual AFM & SPM Meeting*, Royal Microscopy Society.
- 2019 **Hot electrons - a new source of light on the nanoscale**, *10<sup>th</sup> Vacuum Symposium UK*, Coventry, UK.
- 2019 **Hot electrons - a new source of light on the nanoscale**, *London Centre for Nanotechnology*, London, UK.
- 2019 **Hot electrons - a new source of light on the nanoscale**, *ISSC-22*, Swansea, UK.
- 2019 **Towards light-matter interactions on the atomic scale**, *Rank Prize Funds Symposium*, Grasmere, UK.
- 2018 **New origin of scanning tunnelling luminescence**, *Smart Nanomaterials 2018*, Paris, France.
- 2018 **Hot electron chemistry at a distance: nonlocal manipulation with the scanning tunneling microscope**, *5th International Conference on Materials Science and Nanotechnology for Next Generation*, Cappadocia, Turkey.
- 2018 **Design, properties, and characterisation of hollow core optical fibres**, *20<sup>th</sup> International Conference and School on Quantum Electronics: Laser Physics and Applications*, Nessebar, Bulgaria.

### Contributed Talks

- 2018 **Regulating the femtosecond excited-state lifetime of a single molecule**, 5<sup>th</sup> *International Conference on Materials Science and Nanotechnology for Next Generation*, Cappadocia, Turkey.
- 2018 **Atomic dispensers: thermoplasmonic control of alkali vapor pressure for quantum optical applications**, 11th *International Conference in Nanophotonics*, Wroclaw, Poland.
- 2015 **Real-space imaging of hot hole transport: toluene on the Si(111)-7×7 surface**, *Theory Meets Experiment: Molecular Nanoscience and Applications*, London, UK.

### Poster Presentations

Seven poster presentations at: *Eureka: Science in Bath* (2018), *Bath-Bristol CDT in Condensed Matter Physics annual conference* (2016&2015), *Theory Meets Experiment: Molecular Nanoscience and Applications* (2015), *ISSC-20* (2015), *Celebration of Centenary of Frank-Hertz Experiment* (2014)

### Press coverage of research

- **Can a new technique for capturing ‘hot’ electrons make solar cells more efficient?**, *Nanoscale Adv.* (2023)  
Featured in Phys.org and Bath Uni press release.
- **Dialling up the heat on nanoparticles**, *Adv. Opt. Mat.* (2020)  
Featured in Science Daily, Phys.org, Genomeweb, Nanowerk, 360 DX and Bath Uni press release.
- **Quantum computing boost from vapour stabilising technique**, *Nature Commun.* (2019)  
Featured in Science Daily, Phys.org, Scientific Computing, RD, Primeur Magazine, EE World Online, 7th Space Family Portal, EurekAlert!, Bulgarian Embassy in the UK and Bath Uni press releases.
- **New physical effect demonstrated by University of Bath scientists after a 40 year search**, *Phys. Rev. X* (2019)  
Featured in Azonano, Space Daily, Sky Nightly, The Medical News, Science Daily, Phys.org, EurekAlert!, Wikipedia, Bulgarian Embassy in the UK and Bath Uni press releases.
- **Single molecule control for a millionth of a billionth of a second**, *Science* (2018)  
Featured in EurekAlert!, Nanowerk, Azonano, Science Daily, Phys.org, UPI.com, RD, Breitbart News Network, Fars News Agency, Scitech Daily, Science Alert, Chem Europe, Naked Science, Sky Nightly, Space Daily, ZAP, Futura Sciences News, Analytica World and Bath Uni press release.
- **Visualising quantum behaviour of hot electrons for first time**, *Nature Commun.* (2016)  
Featured in Space Daily, Chem Europe, Azonano, Health Medicinet, Science Daily, Alpha Galileo, Nanowerk, My News Desk, EurekAlert!, The Siasat Daily, Nanotechweb, The Indian Express, Times of India, I4U, New Kerala, Big News Network, CanIndia, Business Standard, Technology.org, Sci-News, Phys.org, Newswise, Lab Manager, Sci-news.com, Birmingham Uni and Bath Uni press releases.

- **New method for building on an atomic scale**, *Nature Commun.* (2015)  
Featured in Phys.org, Nanowerk, Technology Org, Birmingham Uni and Bath Uni press releases.

## Professional organisations

Member of the Royal Microscopy Society, UK (RMS).

## Conference organisation

Organiser, Eureka: Physics in the Southwest, University of Bath, UK 2023

Organiser, Eureka: Physics at Bath, University of Bath, UK 2022

## Public Engagement, Outreach, Seminars and Industrial Links

### Outreach in Schools

'Look into My Eyes': Leading workshops for award winning outreach to year 6 in schools across Bath and Wiltshire (2017, 2018 & 2013); Demonstrator during A-level school visit to the University of Bath (2015 & 2016); School visit and presentation at a secondary school in Bulgaria (2016); Presentation at a secondary school in Bulgaria (2023); Volunteer at Bath Taps into Science (2013); IOP STEM school visit to Ralph Allen School (2012).

### Seminars

Department of Physics postgraduate poster session (University of Bath, 2016); Faculty of Science Research Afternoon: presentation, poster and lightning talk (University of Bath, 2014 and 2015); SantaBulgaria Conference Presentation (Bulgarian Embassy, London, 2015).

### Public Engagement

STEM for Britain finals, House of Commons, London (2017).

### Additional Training and Committee Engagement

Eureka 2022 Conference organiser, Early career lunch organiser (2021-), Department self-assessment team (DSAT) member (2017-2019); Bath Academic Career Academy (2017), Reviewer for PCCP, JPC, Optics Express, Nature Commun.

### Industrial Links

- Renishaw plc., Wotton-under-Edge, UK  
I provided consultancy on the use of lock-in techniques for the detection of weak optical signals.
- TMD Technologies Ltd., Hayes, UK  
Project partners on Innovate UK project. Hollow-core fibre filling with Rb.
- Chronos Technology Ltd., Ross-on-Wye, UK  
Project partners on Innovate UK project. Electronic circuit design.
- British Telecoms, London, UK  
Project partners.

## Professional service

Organiser, Early Career Lunch Club, University of Bath, 2021–

Member, Physics Research and Knowledge Exchange Committee, University of Bath, 2022–

Member, Physics Department Self Assessment Team, University of Bath, 2018-2020  
Member, Faculty of Science Prize Fellowship selection panel, University of Bath, 2022  
Referee for journals Nature Communications, Plasmonics, Angewandte Chemie, Optics Express,  
Journal of Physical Chemistry C  
Grant reviewer for the Leverhulme Trust.