Curriculum Vitae

Pritam Khan, PhD
Post-Doctoral Researcher
Department of Physics, University of Limerick
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Nationality: INDIAN, DOB: 08/06/1989
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EMPLOYMENT

March 2021-Present

H2020 ASINA Postdoctoral Fellow, Department of Physics, University of Limerick, Limerick, Ireland
Research Project: Polarization resolved optical response in plasmonic metamaterial.
Collaborator: Prof. Christophe Silien and Prof. Tofail Syed

November 2018-February 2021

Government of Ireland Post-Doctoral (GOIPD) Fellow, Department of Physics, University of Limerick, Limerick, Ireland
Research Project: Transient absorption tomography for non-destructive imaging of nanostructure.
Collaborator: Prof. Christophe Silien

November 2016-November 2018

JSPS (Japan Society for the Promotion of Science) Post-Doctoral Fellow, Department of Physics, Kyushu University, Fukuoka, Japan
Research Project: Ultrafast magnetization dynamics in ferrimagnetic/anti-ferromagnetic materials
Collaborator: Prof. Takuya Satoh

April 2015-August 2015

Visiting Scientist, Department of Materials Science and Engineering, Lehigh University, Bethlehem, Pennsylvania, USA
Research Project: Time resolved AFM studies for growing Ag nanoparticles on the surface of amorphous chalcogenides
Advisors: Prof. Himanshu Jain and Prof. Dmitri Vezenov

EDUCATION

2011-2016 **Doctorate of Philosophy,** Department of Physics, Indian Institute of Science Education and Research Bhopal, MP, India (Award Date: May 2016)
Thesis Title: *Tailoring between network rigidity and lightinduced effects in $Ge_xAs_{35-x}Se_{65}$ thin films*
Supervisor: Prof. K. V. Adarsh

2009-2011 **Master of Science,** Department of Physics, University of Calcutta, India (Award Date: June 2011), **Grade – "A"**, 4.2 on a scale of 6
Thesis Title: *Bimetallic Nanoalloys*

2006-2009 **Bachelor of Science,** Department of Physics, Presidency College, Kolkata, India (Award Date July 2009), **First class**, 72%

RESEARCH INTERESTS

- Ultrafast polarization resolved dark field microscopy in plasmonic nanostructures.
- Polarization resolved Second harmonic generation (SHG) imaging in single crystals.

- Ultrafast spectroscopy in Chalcogenide thins films and nanostructures.
- Light-matter interaction in Chalcogenide thin films in nanoseconds to seconds.
- Photoinduced phenomena in metal/chalcogenide heterosructures.

PUBLICATION SUMMARY

1 patent**, 30** peer reviewed publications**: 25** peer-reviewed Journal articles (4 corresponding author, 19 first author), **5** conference publications (3 first author), **268** Total citations, h-index of **9** (Google Scholar database).

PATENT:

I. C. Silien, **Pritam Khan**, G. Brennan, S. A. M. Tofail and N. Liu, "Plasmon damping and macroscopic polarization conversion in single nanoporous particles," PATENT APPLICATION NUMBER 2110583.8 (2021).

PEER REVIEWED JOURNAL PUBLICATIONS:

1. **Pritam Khan**, G. Brennan, Z. Li, L. A. Hassan, D. Rice, M. Gleeson, A. A. Mani, S. A. M. Tofail, H. Xu, N. Liu and C. Silien, "Circular polarization conversion in single plasmonic spherical particles," *Nano Letters* **22**, 1504-1510 (2022) DOI: 10.1021/acs.nanolett.1c03848, ISSN 1530-6984 (online).
2. A. Sharma, **Pritam Khan*,** D. Mandal, M. Pathak, C. S. Rout, and KV Adarsh, "Unveiling and engineering of third order optical nonlinearities in $NiCo_2O_4$ nanoflowers," *Optics Letters*, **46**, 5390-5393 (2021) DOI: 10.1364/OL.443826, ISSN 2155-3165 (online) (*Corresponding author).
3. **Pritam Khan,** R. K. Yadav, A. Mondal, C. S. Rout, and KV Adarsh, "Observation of pulse-width dependent saturable and reverse saturable absorption in spinel $ZnCo_2O_4$ microflowers," *Optical Materials,* **120**, 111459 (2021). DOI: 10.1016/j.optmat.2021.111459, ISSN 0925-3467 (online).
4. **Pritam Khan*** and KV Adarsh, "Lightinduced Effects in Amorphous Chalcogenide Glasses: Femtoseconds to Seconds," *Physics*, **3**, *255* (2021). DOI: 10.3390/physics3020019, ISSN 2624-8174 (online). (*Corresponding author)
5. Zhe Li, Brian Corbett, Agnieszka Gocalinska, Emanuele Pelucchi, Wen Chen, Kevin M Ryan, **Pritam Khan**, Christophe Silien, Hongxing Xu, and Ning Liu, "Direct visualization of phase-matched efficient second harmonic and broadband sum frequency generation in hybrid plasmonic nanostructures," *Light: Science & Applications*, 9, 1-10 (2020). DOI: 10.1038/s41377-020-00414-4, ISSN 2047-7538 (online).
6. **Pritam Khan,** G. Brennan, J. Lillis, A. M. Tofail, N. Liu and C. Silien, "Characterisation and Manipulation of Polarisation Response in Plasmonic and Magneto-Plasmonic Nanostructures and Metamaterials," *Symmetry*, **12**, 1365 (2020). DOI: 10.3390/sym12081365, ISSN 2073-8994 (online).
7. **Pritam Khan***, M. Kanamaru, K. Matsumoto, T. Ito and T. Satoh, "Ultrafast Light-driven Simultaneous Excitation of Coherent Terahertz Magnons and Phonons in Multiferroic $BiFeO_3$," *Physical Review B* (*Editor's choice*) **101**, 134413 (2020). DOI: 10.1103/PhysRevB.101.134413, ISSN 2469-9969 (online). (*Corresponding author)
8. Dipendranath Mandal, **Pritam Khan**^ and KV Adarsh, "Near resonant nanosecond laser driven nonlinear optical response in $As_{50}S_{50}$ thin films," *Journal of Physics D: Applied Physics* **53**, 245102, (2020) DOI: 10.1088/1361-6463/ab7cf9 (2020), ISSN 1361-6463 (online). (^ Equal first author)
9. A. Aparimita, **Pritam Khan**, J. R. Aswin, KV Adarsh, R. Naik, "Role of thermal and photoannealing on nonlinear optical response of $Ge_{30}Se_{55}Bi_{15}$ thin films," *Journal of Applied Physics* **127**, 075102 (2020). DOI: 10.1063/1.5132579, ISSN 1089-7550 (online).
10. **Pritam Khan***, Masataka Kanamaru, Wei-Hung Hsu, Minori Kichise, Yasuhiro Fujii, Akitoshi Koreeda, and Takuya Satoh, "Excitation of coherent optical phonons in iron garnet by femtosecond laser pulses," *Journal of Physics: Condensed Matter* **31**, 275402 (2019). DOI: 10.1088/1361-648X/ab1665, ISSN 1361-648X. (* Corresponding author)

11. P. Pradhan, **Pritam Khan**, J. R. Aswin, KV Adarsh, R. Naik, N. Das and A. K. Panda "Quantification of nonlinear absorption in ternary As-Sb-Se chalcogenide glasses," *Journal of Applied Physics* **125**, 015105 (2019). DOI: 10.1063/1.5063864, ISSN 1089-7550 (online).
12. **Pritam Khan**, Rajesh Kumar Yadav, and KV Adarsh, "Ultrafast light-induced softening of chalcogenide thin films above the rigidity percolation transition," *Journal of Applied Physics* **124**, 125702 (2018). DOI: 10.1063/1.5050555, ISSN 1089-7550 (online).
13. **Pritam Khan**, Yinsheng Xu, William Leon, KV Adarsh, Dmitri Vezenov, Ivan Biaggio and Himanshu Jain "Kinetics of photo-dissolution within Ag/As_2S_3 heterostructure," *Journal of Non-Crystalline Solids* **500**, 468 (2018). DOI: 10.1016/j.jnoncrysol.2018.09.001, ISSN 0022-3093.
14. **Pritam Khan**, Arinjoy Bhattacharya, Abin Joshy, Vasant Sathe, Uday Deshpande and KV Adarsh, "Investigation of Temperature Dependent Optical Modes in GexAs35-xSe65 Thin Films: Structure Specific Raman, FIR and Optical Absorption Spectroscopy," *Thin Solid Films* **621,** 76 (2017). DOI: 10.1016/j.tsf.2016.11.037, ISSN 0040-6090.
15. **Pritam Khan**, Abin Joshy, Arinjoy Bhattacharya and KV Adarsh, "Observation of giant photodarkening and temperature mediated transition to photobleaching in As_2Se_3/Ag/Se trilayer," *Journal of Non-Crystalline Solids* **449**, 70 (2016). DOI: 10.1016/j.jnoncrysol.2016.07.022, ISSN 0022-3093.
16. Rituraj Sharma, **Pritam Khan**, J Aneesh, KS Sangunni, I Csarnovics, S Kokenyesi, H Jain, KV Adarsh, "Strong exciton-localized plasmon coupling in a-$Ge_{24}Se_{76}$/AuNP heterostructure," *Applied Physics Letters Materials* **4**, 106105 (2016). DOI: 10.1063/1.4964365, ISSN 2166-532X (online).
17. **Pritam Khan**, Rajesh Kumar Yadav, Arinjoy Bhattacharya, Abin Joshy, Aneesh J and KV Adarsh, "Tuning nanosecond transient absorption in a-$Ge_{25}As_{10}Se_{65}$ thin films via background illumination", *Optics Letters* **40**, 4512 (2015). DOI: 10.1364/OL.40.004512, ISSN 2155-3165 (online).
18. **Pritam Khan**, Rituraj Sharma, Uday Deshpande, and KV Adarsh, "First observation of temperature dependent lightinduced response of $Ge_{25}As_{10}Se_{65}$ thin films", *Optics Letters* **40**, 1559 (2015). DOI: 10.1364/OL.40.001559, ISSN 2155-3165 (online).
19. **Pritam Khan**, Prodip Acharja, Abin Joshy, Arinjoy Bhattacharya, Deepak Kumar, KV Adarsh, "Nanosecond lightinduced transient absorption in As_2S_3: Self-trapped exciton recombination in amorphous chalcogenides", *Journal of Non-Crystalline Solids* **426**, 72 (2015). DOI: 10.1016/j.jnoncrysol.2015.07.002, ISSN 0022-3093.
20. **Pritam Khan**, Tarun Saxena, and KV Adarsh," Tailoring between network rigidity and nanosecond transient absorption in a-$Ge_xAs_{35-x}Se_{65}$ thin films", Optics *Letters* **40**, 768 (2015). DOI: 10.1364/OL.40.000768, ISSN 2155-3165 (online).
21. Binu S, **Pritam Khan**^, Amiya Ranjan Barik, Rituraj Sharma, Roman Golovchak, Himanshu Jain and KV Adarsh, "Photoinduced formation of Ag nanoparticles on the surface of As_2S_3/Ag thin bilayer", *Materials Research Express* **1**, 045025 (2014). DOI: 10.1088/2053-1591/1/4/045025, ISSN 2053-1591. (^Equal first author)
22. **Pritam Khan**, Tarun Saxena, H. Jain and KV Adarsh, "Nanosecond light induced, thermally tunable transient dual absorption bands in a-$Ge_5As_{30}Se_{65}$ thin films", *Scientific Reports* **4**, 6573 (2014). DOI: 10.1038/srep06573, ISSN 2045-2322 (online).
23. **Pritam Khan**, H. Jain and KV Adarsh, "Role of Ge:As ratio in controlling the light-induced response of a-$Ge_xAs_{35-x}Se_{65}$ thin films, *Scientific Reports* **4**, 4029 (2014). DOI: 0.1038/srep04029, ISSN 2045-2322 (online).
24. Mukund Bapna, Rituraj Sharma, A. R. Barik, **Pritam Khan**, R. R. Kumar and KV Adarsh, "Light induced diffusion driven self- assembly of Ag nanoparticles in a-Se/Ag bilayer thin film with ultrafast optical response", *Applied Physics Letters* **102**, 213110 (2013). DOI: 10.1063/1.4807934, ISSN 2166-532X (online).
25. **Pritam Khan**, A. R. Barik, E. M. Vinod, K. S. Sangunni, H. Jain and KV Adarsh, "Coexistence of fast photodarkening and slow photobleaching in $Ge_{19}As_{21}Se_{60}$ thin films", *Optics Express* **20**, 12416 (2012). DOI: 10.1364/OE.20.012416, ISSN 1094-4087**.**

PEER REVIEWED CONFERENCE PUBLICATIONS

26. Rituraj Sharma, **Pritam Khan**, Aneesh J, Istvan Csarnovics, Sándor Kokenyesi, Himanshu Jain, and KV Adarsh, "Strong Exciton-plasmon Coupling in a-$Ge_{24}Se_{76}$/AuNP Heterostructure," *CLEO: Science and Innovations* JW2A. 42 (2016).
27. **Pritam Khan**, A. R. Barik, E. M. Vinod, K. S. Sangunni and KV Adarsh, "Observation of photobleaching and intensity dependent kinetics in $Ge_{22}As_{22}Se_{56}$ thin films under sub- bandgap light illumination", *IOP Conf. Series: Materials Science and Engineering* **73**, 012073 (2015). DOI: 10.1088/1757-899X/73/1/012073, ISSN 1757-899X (online).
28. **Pritam Khan** and KV Adarsh, "Composition dependent lightinduced crossover from photodarkening to photobleaching in a-$Ge_xAs_{35-x}Se_{65}$ thin films", *AIP Conference proceedings* **1591**, 793 (2014). DOI: 10.1063/1.4872758, ISSN 1551-7616 (online).
29. **Pritam Khan**, Rituraj Sharma and KV Adarsh, "Nanosecond light induced transient absorption in $Ge_5As_{30}Se_{65}$ thin films, *AIP Conference proceedings* **1512**, 558 (2013). DOI: 10.1063/1.4791159, ISSN 1551-7616 (online).
30. Rituraj Sharma**, Pritam Khan**, Binu S and KV Adarsh, "Time evolution of photo- generated defect states in a-Se thin films", AIP *Conference proceedings* **1512**, 556 (2013). DOI: 10.1063/1.4791158, ISSN 1551-7616 (online).

FUNDINGS AND AWARDS

Funding/Awarding Body	Funding type	Amount (€)	Country	Year
Irish research Council (**IRC**)	Postdoctoral fellowship	92,000	Ireland	2018
Japan Society for the Promotion of Science (**JSPS**)	Postdoctoral fellowship	90,444	Japan	2016
Tel Aviv University Center for Nanoscience and Nanotechnology (**TAU**)	Postdoctoral fellowship	60,000	Israel	2016
International Materials Institute for New Functionality of Glass (**IMI-NFG**)	Visiting Scientist scholarship	10,000	USA	2015
Department of Science and Technology (**DST**), Govt. of India	Travel allowance	1,400	India	2014
Conference committee: International Conference on materials Science and Technology (ICMST)	Best **Oral** Presentation	100	India	2012
Ministry of Human Resource Development (**MHRD**), Govt. of India	Doctoral scholarship	20,000	India	2011

TALKS & CONFERENCES

Presentation Summary: **Total 20** (**6** Invited talks, **9** Oral presentations, **5** Poster presentations)

I. INVITED TALKS

1. Institute of Physics, **University of Debrecen**, Debrecen, **Hungary**, March 24, 2017. "Tailoring between network rigidity and lightinduced effects in chalcogenides".
2. Department of Graphic Arts and Photophysics, **University of Pardubice**, Pardubice, **Czech Republic**, March 22, 2017. "Continuous wave and nanosecond laser induced effects in chalcogenides".
3. Faculty of Chemical Technology, **University of Pardubice**, Pardubice, **Czech Republic**, March 21, 2017. "Photo-dissolution and photo-diffusion of metallic Ag in As_2S_3 matrix".
4. Department of Physics, **Universidade Nova de Lisboa**, Lisbon, **Portugal**, March 16, 2017. "Photoinduced phenomena in amorphous chalcogenides".

5. School of Physics, **Wuhan University**, Wuhan, **China**, May 5, 2016. "Tailoring between network rigidity and lightinduced effects in $Ge_xAs_{35-x}Se_{65}$ thin films."
6. Department of Physics, **Indian Institute of Science Education and Research (IISER) Kolkata**, **India**, May 23, 2014. "Role of temperature and rigidity in controlling the light-induced response of Ge-As-Se network glasses".

II. ORAL PRESENTATIONS

7. ICM seminar UL-Russia, Limerick, **Ireland**, June 14, 2021.
8. **Photonics Ireland**, Dublin, **Ireland**, June 14-16, 2021.
9. **International Workshop on Physics of Semiconductor Devices (IWPSD)**, Kolkata, **India**, December 17-20, 2019.
10. **MOSAIC GROUP End of Year Workshop**: Interface between Biology, Chemistry and Physics, University of Limerick, **Ireland**, November 30, 2018
11. **Magnetics and Optics Research International Symposium (MORIS)**, Queens, New York, **USA**, January 7-10, 2018.
12. **62nd Annual Conference on magnetism and Magnetic Materials (MMM)**, Pittsburgh, **USA**, November 6-10, 2017.
13. **In-house Symposium**, Department of Physics, Indian Institute of Science Education and Research (IISER) Bhopal, **India**, November 4, 2015.
14. **International symposium on Non-Oxide and New Optical Glasses (ISNOG)**, Jeju**, South Korea**, August 24-28, 2014.
15. **International conference on Materials Science and Technology (ICMST**), St. Thomas College, Pala, Kerala, **India**, June 10-14, 2012.

III. POSTER PRESENTATIONS

16. **7th Workshop of the Core-to-Core Project Tohoku-York-Kaiserslautern**, Kaiserslautern, **Germany**, May 28-30, 2018.
17. **Spintech IX**, Fukuoka, **Japan**, June 4-8, 2017
18. **International School on Spintronics and Spin-Orbitronics**, Fukuoka, **Japan**, December 16-17, 2016
19. 58th **DAE Solid State Physics Symposium**, Thapar University, Patiala, **India**, December 17-21, 2013.
20. 57th **DAE Solid State Physics Symposium**, IIT Bombay, Bombay, **India**, December 3-7, 2012.

Co-SUPERVISION AND MENTORICNG ACTIVITIES

As Postdoc in University of Limerick, Ireland

1. Mr. Ankit Sharma, PhD student, IISER Bhopal **2021**
2. Mr. Michael Geoghegan, Summer student, University of Limerick **2021**
3. Mr. Dipendranath Mandal, PhD student, IISER Bhopal **2020**

As Postdoc in Kyushu University, Japan

4. Mr. Masataka Kanamaru, Master's Thesis, Title "Ultrafast excitation of coherent magnons in multiferroic $BiFeO_3$," **2018**

   Current: Software Trainee, NEC Solution Innovators

During PhD in IISER Bhopal, India

5. Mr. Abin Joshy, BS-MS Thesis, Title "Role of network rigidity in controlling the ultrafast lightinduced response in Ge-As-Se thin films" **2015**

   Current: Graduate Student, Tulane University

6. Mr. Arinjoy Bhattacharya, BS-MS Thesis, Thesis title "Observation of giant photodarkening and slow crossover to photobleaching in a-As_2Se_3/Ag/Se trilayer thin films" **2015**
   Current: Graduate Student, The State University of New York at Buffalo
7. Mr. Tarun Saxena, BS-MS Thesis, Title "Role of temperature in controlling the light-induced response in ternary Ge-As-Se Chalcogenide glasses" **2014**

TEACHING EXPERIENCE

Course Tutor, PH4091, Physics of Modern Measurements, University of Limerick	**Fall 2019**
Course Tutor, PHY-403, Condensed Matter Physics, IISER Bhopal	**Fall 2015**
Lab Tutor, PHY-338, Integrated Physics PhD Lab, IISER Bhopal	**Spring 2015**
Lab Tutor, PHY-203, General Physics Lab, IISER Bhopal	**Fall 2014**
Lab Tutor, PHY-204, Electronics Lab, IISER Bhopal	**Spring 2014**
Lab Tutor, PHY-307, PG Physics Lab, IISER Bhopal	**Fall 2013**
Lab Tutor, PHY-204, Electronics Lab, IISER Bhopal	**Spring 2013**
Lab Tutor, PHY-203, General Physics Lab, IISER Bhopal	**Fall 2012**

TECHNICAL EXPERTISE

1. Ultrafast transient absorption (TA) spectroscopy
2. Magneto-optical pump-probe spectroscopy
3. Ultrafast dark-filed microscopy
4. Second harmonic generation (SHG) microscopy
5. Micro Raman and FTIR spectroscopic Measurement
6. Fabrication of thin films

COMPUTER SKILLS

Language proficiency: C and EXCEL

Software proficiency: Origin, ImageJ, Gwyddion, GLOTARAN, and SigmaPlot

OTHER WORK EXPERIENCE

1. Laboratory for Multifunctional Ferroic Materials, ETH Zurich, **Switzerland**
Purpose: *Performing pump-probe measurements of $BiFeO_3$ at liquid He temperature in high magnetic field* **2018**
2. Department of Physics, Koreeda Lab, Ritsumeikan University, **Japan**
Purpose: *To measure Raman spectra of Iron garnet at liquid N_2 environment* **2017**
3. ESCA and Molecular Spectroscopy Lab, UGC-DAE Consortium for Scientific Research, **India**
Purpose: *In-situ pump-probe FTIR measurements in Ge-As-Se thin films* **2014**

LIST OF REFERENCES

1. K. V. Adarsh, Ph. D (PhD Supervisor)
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2. Takuya Satoh, Ph. D (Post-doc Advisor)
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Email: satoh@phys.titech.ac.jp

3. Himanshu Jain, Ph. D (International Collaborator)
T.L. Diamond Distinguished Chair in Engineering and Applied Science
and Professor of Material Science and Engineering, Lehigh University
Director, Int'l Materials Inst. for New Functionality in Glass (IMI-NFG)
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