



# VIDYA KOCHAT

ASSISTANT PROFESSOR  
MATERIALS SCIENCE CENTRE, INDIAN INSTITUTE OF TECHNOLOGY,  
KHARAGPUR, WEST BENGAL-721302, INDIA

## CONTACT

Email : [vidya@matsc.iitkgp.ac.in](mailto:vidya@matsc.iitkgp.ac.in)

## RESEARCH AREAS

Novel growth techniques for  
2D materials

Electronics & Optoelectronics  
in low dimensional systems to  
explore magnetism,  
superconductivity, correlations,  
light-matter coupling induced  
effects and quantum transport

Electronic and structural phase  
transitions thermally induced,  
electric/magnetic field induced  
and light-induced in 2D  
materials

## PROFESSIONAL EXPERIENCE

ASSISTANT PROFESSOR • IIT KHARAGPUR • FEB 2019 ONWARDS  
Materials Science Centre

POSTDOCTORAL FELLOW • RICE UNIVERSITY, USA • APR 2015 - JULY 2017  
Smalley Postdoctoral fellow in Quantum Materials  
Materials Science and Nano Engineering

RESEARCH ASSOCIATE • INDIAN INSTITUTE OF SCIENCE • DEC 2014 – JAN 2015  
Dept. of Physics

## EDUCATION

Ph.D • 2009 - 2014 • DEPT. OF PHYSICS, INDIAN INSTITUTE OF SCIENCE  
Advisor: Prof. Arindam Ghosh

Thesis: *Impact of Disorder, Magnetism and Proximity-Induced Superconductivity on  
Conductance Fluctuations in Graphene*

M.Sc • 2007 - 2009 • INDIAN INSTITUTE OF TECHNOLOGY, ROORKEE

B.Sc • 2004 - 2007 • STELLA MARIS COLLEGE, CHENNAI

## TECHNICAL EXPERTISE

---

Novel synthesis techniques of 2D materials

Device fabrication and lithography

AC and DC electronic transport measurements

Ultra-low temperature cryostat technology

Expertise in beam-line facilities at synchrotron (X-ray absorption spectroscopy, ultrafast electron diffraction)

## ACHIEVEMENTS AND AWARDS

---

- Smalley-Curl Fellowship in Quantum Materials by Rice Centre for Quantum materials, 2015.
- Malhotra Weikfield Foundation Nano Science Fellowship Award 2014.
- GATE – 2009 (Graduate Aptitude Test in engineering) rank 11 with a percentile of 99.75 in Physics paper.
- Obtained the CSIR – JRF scholarship in 2008
- Gold medalist during M.Sc from Indian Institute of Technology, Roorkee.
- Umachandran award for the most meritorious student of the department by Dept of Physics, Stella Maris College, Chennai in 2007.
- Visiting Summer Research Fellow of Tata Institute of Fundamental Research during May-July 2008 under the supervision of Dr. V Nanal, Dept. of Nuclear and Atomic Physics, TIFR, Mumbai.
- Summer research fellow of the Indian Academy of Sciences during May-July 2007 under the supervision of Prof.S.V.Bhat, Dept of Physics, Indian Institute of Science, Bangalore.
- Summer Visiting student fellow of the Indian Academy of Sciences during April-June 2006 under the supervision of Dr.S.Kailas, Nuclear Physics Division, Bhabha Atomic Research Centre, Mumbai.

## LIST OF PUBLICATIONS

---

1. "High contrast imaging and thickness determination of graphene with in-column secondary electron microscopy", **Vidya Kochat**, Atindra Nath Pal, E. S. Sneha, Arjun Sampathkumar, Anshita Gairola, S. A. Shivashankar, Srinivasan Raghavan and Arindam Ghosh, *Journal of Appl. Phys.* **110**, 014315 (2011).
2. "Microscopic mechanism of 1/f noise in graphene: Role of energy band dispersion", Atindra Nath Pal, Subhamoy Ghatak, **Vidya Kochat**, Sneha E. S., Arjun B. S., Srinivasan Raghavan and Arindam Ghosh, *ACS Nano* **5**, 2075 - 2081 (2011).
3. "Direct observation of valley-hybridization and universal symmetry of graphene with mesoscopic conductance fluctuations", Atindra Nath Pal, **Vidya Kochat** and Arindam Ghosh, *Physical Review Letters* **109**, 196601 (2012).
4. "Fermi-Edge Transmission Resonance in Graphene Driven by a Single Coulomb Impurity", Paritosh Karnatak, Srijet Goswami, **Vidya Kochat**, Atindra Nath Pal, and Arindam Ghosh, *Physical Review Letters* **113**, 026601 (2014).
5. "Origin of 1/f noise in graphene produced for large-scale applications in electronics", **V. Kochat**, Anindita Sahoo, Atindra Nath Pal, Sneha Eashwer, Gopalakrishnan Ramalingam, Arjun Sampathkumar, Ryugu Tero, Tran Viet Thu, Sanjeev Kaushal, Hiroshi Okada, Adarsh Sandhu, Srinivasan Raghavan, Arindam Ghosh, *IET Circuits, Devices & Systems* **9**, 52 (2015).
6. "Insights on Defect-Mediated Heterogeneous Nucleation of Graphene on Copper", Priyadarshini Ghosh, Shishir Kumar, Gopalakrishnan Ramalingam, **Vidya Kochat**, Madhavan Radhakrishnan, Sukanaya Dhar, Satyam Suwas, Arindam Ghosh, N. Ravishankar and Srinivasan Raghavan, *J. Phys. Chem. C* **119**, 2513 (2015).
7. "Magnitude and Origin of Electrical Noise at Individual Grain Boundaries in Graphene", **Vidya Kochat**, Chandra Sekhar Tiwary, Tathagata Biswas, Gopalakrishnan Ramalingam, Kimberly Hseih, Kamanio Chattopadhyay, Srinivasan Raghavan, Manish Jain and Arindam Ghosh, *NanoLetters* **16**, 562 (2016).
8. "2D Heterostructure coatings of hBN-MoS<sub>2</sub> layers for corrosion resistance", Sajith Vandana, **Vidya Kochat**, Jonghoon Lee, Vikas Varshney, Sadegh Yazdi, Jianfeng Shen, Suppanat Kosolwattana, Soumya Vinod, Robery Vajtai, Ajit K Roy, Chandra Sekhar Tiwary and P M Ajayan, *J. Phys. D: Appl. Phys.* **50**, 045301 (2016).
9. "Metal Immiscibility Route to Synthesis of Ultrathin Carbides, Borides, and Nitrides", Zixing Wang, **Vidya Kochat**, Prafull Pandey, Sanjay Kashyap, Soham Chattopadhyay, Atanu Samanta, Suman Sarkar, Praveena

- Manimunda, Xiang Zhang, Syed Asif, Abhishek K. Singh, Kamanio Chattopadhyay, Chandra Sekhar Tiwary, Pulickel M. Ajayan, *Advanced Materials* **29**, 1700364 (2017).
10. "Fluorinated h-BN as magnetic semiconductor", Sruthi Radhakrishnan, Deya Das, Atanu Samanta, Carlos de los Reyes, Liangzi Deng, Lawrence B. Alemany, Thomas K. Weldeghiorghis, Valery N. Khabashesku, **Vidya Kochat**, Zehua Jin, Parambath M. Sudeep, Angel A. Martí, Ching-Wu Chu, Ajit Roy, Chandra Sekhar Tiwary, Abhishek K. Singh, Pulickel M. Ajayan, *Science Advances*. **3**, e1700842 (2017).
  11. "Ultrafast non-radiative dynamics of atomically thin MoSe<sub>2</sub>", Ming-Fu Lin, **Vidya Kochat**, Aravind Krishnamoorthy, Clemens Weninger, Xiang Zhang, Amey Apte, Chandra Tiwary, Renkai Li, Oleg Prezhdo, Rajiv Kalia, Pulickel Ajayan, Aiichiro Nakano, Xijie Wang, Priya Vashishta, David Fritz, Uwe Bergmann *Nature Communications* **8**, 1745 (2017).
  12. "Re Doping in 2D Transition Metal Dichalcogenides as a New Route to Tailor Structural Phases and Induced Magnetism", **Vidya Kochat**, Amey Apte, Jordan A. Hachtel, Hiroyuki Kumazoe, Aravind Krishnamoorthy, Sandhya Susarla, Juan Carlos Idrobo, Fuyuki Shimojo, Priya Vashishta, Rajiv Kalia, Aiichiro Nakano, Chandra Sekhar Tiwary and Pulickel M. Ajayan *Advanced Materials* **29**, 1703754 (2017).
  13. "Phase Segregation Behavior of Two-Dimensional Transition Metal Dichalcogenide Binary Alloys Induced by Dissimilar Substitution", Sandhya Susarla, **Vidya Kochat\***, Alex Kutana, Jordan A. Hachtel, Juan Carlos Idrobo, Robert Vajtai, Boris I. Yakobson, Chandra Sekhar Tiwary, and Pulickel M Ajayan *Chemistry of Materials* **29**, 7431 (2017).
  14. "Quaternary 2D transition metal dichalcogenides with tunable bandgap", Sandhya Susarla, Alex Kutana, Jordan A. Hachtel, **Vidya Kochat**, Amey Apte, Robert Vajtai, Juan Carlos Idrobo, Boris I. Yakobson, Chandra Sekhar Tiwary and Pulickel M. Ajayan *Advanced Materials* **29**, 1702457 (2017).
  15. "Directly Identifying Phase Segregation in 2D Quaternary Alloys", Jordan A Hachtel, Sandhya Susarla, **Vidya Kochat**, Chandrasekhar Tiwary, Pulickel Ajayan, Juan Carlos Idrobo, *Microscopy and Microanalysis* **23**, 1438 (2017).
  16. "Effect of Carrier Localization on Electrical Transport and Noise at Individual Grain Boundaries in Monolayer MoS<sub>2</sub>", Kimberly Hsieh, **Vidya Kochat**, Xiang Zhang, Yongji Gong, Chandra Sekhar Tiwary, Pulickel M. Ajayan and Arindam Ghosh *Nano Letters* **17**, 5452 (2017).
  17. "Atomically thin gallium layers from solid-melt exfoliation", **Vidya Kochat**, A. Samanta, Y. Zhang, S. Bhowmick, S. A. S. Asif, Robert Vajtai, A. K. Singh, C. S. Tiwary, P. M. Ajayan *Science Advances* **4** (3), e1701373, 2018.

18. "Consolidation of Functionalized Graphene at Ambient Temperature via Mechano-chemistry", Mohamad A Kabbani, **Vidya Kochat**, Sanjit Bhowmick, Matias Soto, Anirban Som, KR Krishnadas, Cristiano F Woellner, Ygor M Jaques, Enrique V Barrera, Syed Asif, Robert Vajtai, Thalappil Pradeep, Douglas S Galvão, Ahmad T Kabbani, Chandra Sekhar Tiwary, Pulickel M Ajayan, *Carbon* **134**, 491 (2018).
19. "Structural Phase Transformation in Strained Monolayer MoWSe<sub>2</sub> alloy", Amey Apte, **Vidya Kochat**, Pankaj Rajak, Aravind Krishnamoorthy, Praveena Manimunda, Jordan A Hachtel, Juan Carlos Idrobo, Syed Asif Syed Amanulla, Priya Vashishta, Aiichiro Nakano, Rajiv K Kalia, Chandra Sekhar Tiwary, Pulickel M Ajayan, *ACS Nano* **12**, 3468 (2018).
20. "Exfoliation of a non-van der Waals material from iron ore hematite", Aravind Puthirath Balan, Sruthi Radhakrishnan, Cristiano F Woellner, Shyam K Sinha, Liangzi Deng, Carlos de los Reyes, Banki Manmadha Rao, Maggie Paulose, Ram Neupane, Amey Apte, **Vidya Kochat**, Robert Vajtai, Avetik R Harutyunyan, Ching-Wu Chu, Gelu Costin, Douglas S Galvao, Angel A Martí, Peter A Aken, Oomman K Varghese, Chandra Sekhar Tiwary, Anantharaman Malie Madom Ramaswamy Iyer, Pulickel M Ajayan, *Nature Nanotechnology* **13**, 602 (2018).
21. "Polytypism in ultrathin tellurium", Amey Apte, Elisabeth Bianco, Aravind Krishnamoorthy, Sadegh Yazdi, Rahul Rao, Nicholas Glavin, Hiroyuki Kumazoe, Vikas Varshney, Ajit Roy, Fuyuki Shimojo, Emilie Ringe, Rajiv K Kalia, Aiichiro Nakano, Chandra Sekhar Tiwary, Priya Vashishta, **Vidya Kochat** and Pulickel M Ajayan, *2D materials* **6**, 015013 (2018).
22. "Optical control of non-equilibrium phonon dynamics", Aravind Krishnamoorthy, Ming-Fu Lin, Clemens Weninger, Xiang Zhang, Ruru Ma, Alexander Britz, Amey Apte, **Vidya Kochat**, Chandra Sekhar Tiwary, Jie Yang, Suji Park, Renkai Li, Xiaozhe Shen, Xijie Wang, Rajiv Kalia, Aiichiro Nakano, Fuyuki Shimojo, David Fritz, Uwe Bergmann, Pulickel M Ajayan, Priya Vashishta (*under review*).

## BOOK CHAPTER

---

1. **Vidya Kochat**, Srijith Goswami, Atindra Nath Pal and Arindam Ghosh, (2012) *Physics of Electrical Noise in Graphene*, in *Graphene: Synthesis, Properties, and Phenomena* (eds C. N. R. Rao and A. K. Sood), Wiley-VCH Verlag GmbH & Co. KGaA, Weinheim, Germany. doi: 10.1002/9783527651122.ch5

## CONFERENCE PROCEEDINGS

---

1. "Universal Conductance Fluctuations as a direct probe to valley coherence and universality class of disordered graphene", **Vidya Kochat**, Atindra Nath Pal and Arindam Ghosh, *AIP Conference Proceedings* **1566**, 161 (2013).
2. "Reading valley-hybridization and universal symmetry of graphene with mesoscopic conductance fluctuations", **V Kochat**, AN Pal, A Ghosh, *APS meeting abstracts* (2014).
3. "Conductivity noise as a transport-based probe to study the charge-carrier transmission across grain boundaries in polycrystalline graphene", **Vidya Kochat**, Chandra Sekhar Tiwary, Tathagata Biswas, Gopalakrishnan Ramalingam, Srinivasan Raghavan, Kamanio Chattopadhyay, Manish Jain, Arindam Ghosh, *Bulletin of the American Physical Society* **60** (2015).
4. "Photo-induced Subpicosecond Temperature Jump in MoSe<sub>2</sub> bilayer", Ming-Fu Lin, Clemens Weninger, **Vidya Kochat**, Amey Apte, Xiang Zhang, Pulickel Ajayan, Oleg Prezhdo, Kristin Persson, Aiichiro Nakano, Renkai Li, Xijie Wang, Priya Vashishta, David Singh, David Fritz, Uwe Bergmann, *Bulletin of the American Physical Society* **62** (2017).
5. "Anomalous Number Fluctuation Noise in Localized Transition Metal Dichalcogenide Layers: Generalization of McWhorter's Mechanism", Kimberly Hsieh, Subhamoy Ghatak, **Vidya Kochat**, Xiang Zhang, Yongji Gong, Chandra Sekhar Tiwary, Sanjeev Kaushal, Pulickel M Ajayan, Arindam Ghosh, *MRS Advances* **3**, 299 (2018).
6. "Ultrafast Electron-Phonon and Phonon-Phonon Interactions in Multilayer 2H-MoTe<sub>2</sub>", Ming-Fu Lin, Aravind Krishnamoorthy, Clemens Weninger, Xiang Zhang, **Vidya Kochat**, Amey Apte, Xiaozhe Shen, Rajiv Kalia, Pulickel Ajayan, Aiichiro Nakano, Priya Vashishta, Xijie Wang, David Fritz, Uwe Bergmann, *Bulletin of the American Physical Society* (2018).

7. "Quaternary two dimensional transition metal dichalcogenide alloys", Sandhya Susarla, Alex Kutana, Jordan Hachtel, **Vidya Kochat**, Amey Apte, Robert Vajtai, Juan Carlos Idrobo, Boris Yakobson, Chandra Sekhar Tiwary, Pulickel Ajayan, *Bulletin of the American Physical Society* (2018).
8. "Structural phase transition and magnetic behavior in two-dimensional rhenium-doped molybdenum diselenide", Amey Anant Apte, **Vidya Kochat**, Jordan Hachtel, Hiroyuki Kumazoe, Aravind Krishnamoorthy, Sandhya Susarla, Juan Carlos Idrobo, Fuyuki Shimojo, Priya Vashishta, Rajiv Kalia, Aiichiro Nakano, Chandra Sekhar Tiwary, Pulickel Ajayan, *Bulletin of the American Physical Society* (2018).