# SAJAL DHARA

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## Professional Experience

- **Assistant Professor**- Department of Physics, Indian Institute of Technology, Kharagpur (2016- Present)
- **Postdoctoral associate**- Institute of Optics, University of Rochester, Rochester, NY, USA (2015- 2016)
- **Postdoctoral fellow**- MSE, University of Pennsylvania, PA, USA (2012-2015)

## Education

- **PhD in Physics**- Tata Institute of Fundamental Research, Mumbai, India (2012)
- **MSc in Physics**- Indian Institute of Technology, Kharagpur, India, (2005)
- **BSc in Physics**- Presidency Collage, Calcutta, India (2003)

## Awards

- **Graduate student award**: European Material Research Society spring meeting (EMRS), June 2010, Strasbourg, France
- **2012 Technoinventor Award:** India Semiconductor Association
- **Ramanujan Fellowship, 2016**

## *Areas of research/Expertise*

My research areas are focused on Quantum optoelectronics and electron transport in semiconductor nanostructures. Areas of research are given below:

- **Light-matter interaction**: My present interest is to study the Exciton-polaritons in optical microcavity using graphene like two-dimensional semiconductors such as transition metal dichalcogenides (TMDCs).

- **Scanning photocurrent spectroscopy**: I had developed a photocurrent microscope setup to look at circular photo galvanic effect (CPGE) in individual nanostructures. CPGE is now becoming a promising tool to look at topological surface states and valley physics in graphene-like two dimensional materials.

- **Nano scale devices and electron transport**: During my Ph.D. I worked on nanowire electron transport with the title of my thesis: Electrical and thermal transport studies in individual InAs nanowires, Advisors: Prof. Mandar M. Deshmukh & Prof. Arnab Bhattacharya, Tata Institute of Fundamental Research, Mumbai. I had grown III-V nanowires using MOCVD, developed

novel techniques for fabrication of nanowire field effect transistors with different geometries such as wrap-around-gate devices, suspended nanowire devices etc.

## *List of Publications*

1. Room Temperature Valley Coherence in a Polaritonic System,
   L. Qiu, C. Chakraborty, **S. Dhara**, and A. N. Vamivakas- **Nature Communications** 10, 1513 (2019)

2. Anomalous dispersion of microcavity trion-polaritons,
   **S. Dhara**, C. Chakraborty, K. Goodfellow, L. Qiu, T. Oloughlin, G. W. Wicks, Subhro Bhattacharjee and A. N. Vamivakas - **Nature Physics** 14, 130-133 (2018)

3. 3D localized trions in monolayer WSe2 in a charge tunable van der Waals heterostructure,
   C. Chakraborty, L. Qiu, K. Konthasinghe, A. Mukherjee, **S. Dhara,** N. Vamivakas – **Nano Lett.** 2018, 18 (5), pp 2859–2863

4. Quantum-Confined Stark Effect of Individual Defects in a van der Waals Heterostructure,
   C. Chakraborty, K. M. Goodfellow, **S. Dhara**, A. Yoshimura, V. Meunier, and A. N. Vamivakas- **Nano Lett.** 2017, 17, 2253−2258 (2017).

5. Voltage tunable circular photogalvanic effect in Si nanowire,
   **S. Dhara**, E. J. Mele and R. Agarwal. – **Science** 349, 726-729 (2015).

6. Carrier transport in high mobility InAs nanowire junctionless transistors.
   A. Konar, J. Mathew, K. Nayak, M. Bajaj, R. K. Pandey, **S. Dhara**, K. V. R. M. Murali, M. Deshmukh. -**Nano Lett.** 15, 1684-1690 (2015).

7. Direct observation of metal-insulator transition in single-crystalline germanium telluride nanowire memory devices prior to amorphization,
   P. Nukala, R. Agarwal, X. Qian, M. H. Jang, **S. Dhara**, K. Kumar, A. T. C. Johnson, Ju Li, and R. Agarwal. -**Nano Lett.** 14, 2201-2209 (2014).

8. High Q electromechanics with InAs nanowire quantum dots,

H. S. Solanki, S. Sengupta, S. Dubey, V. Singh, **S. Dhara**, A. Kumar, A. Bhattacharya, S. Ramakrishnan, A. A. Clerk, M. M. Deshmukh. -**Appl. Phys. Lett.** 99, 213104 (2011).

9. Field-effect modulation of conductance in VO2 nanobeam transistors with HfO2 as the gate dielectric,

   S. Sengupta, K. Wang, K. Liu, A. K. Bhat, **S. Dhara**, J. Wu, M. M. Deshmukh. - **Appl. Phys. Lett.** 99, 062114 (2011).

10. Tunable thermal conductivity in defect engineered nanowires,

    **S. Dhara**, H. S. Solanki, A. Pawan R., V. Singh, S. Sengupta, B. A. Chalke, A. Dhar, M. Gokhale, A. Bhattacharya and M. M. Deshmukh. – **Phys. Rev. B** 84, 121307(R) (2011).

11. Facile fabrication of lateral nanowire wrap-gate devices with improved performance,

    **S. Dhara**, S. Sengupta, H. S. Solanki, A. Maurya, A. Pavan R., M. R. Gokhale, A. Bhattacharya and M. M. Deshmukh. - Appl. Phys. Lett. 99, 173101 (2011).

    ***Featured in Nature News and Views,*** *Nature 481, 152 (2012)*.

12. Nanoscale electromechanical resonators as probes of the charge density wave transition in NbSe2,

    S. Sengupta, H. S. Solanki, V. Singh, **S. Dhara** and M. M. Deshmukh. - **Phys. Rev. B** 82, 155432 (2010).

13. Probing thermal expansion of graphene and modal dispersion at low-temperature using graphene NEMS resonators,

    V. Singh, S. Sengupta, H. S. Solanki, R. Dhall, A. Allain, **S. Dhara**, P. Pant and M. M. Deshmukh. - **Nanotechnology** 21 209801 (2010).

14. Tuning mechanical modes and influence of charge screening in nanowire resonators,

    H. S. Solanki, S. Sengupta, **S. Dhara**, V. Singh, R. Dhall, J. Parpia, A. Bhattacharya, and M. M. Deshmukh. - **Phys. Rev. B** 81, 115459 (2010).

15. Magnetotransport properties of individual InAs nanowires,

    **S. Dhara**, H. S. Solanki, V. Singh, A. Narayanan, P. Chaudhari, M. Gokhale, A. Bhattacharya, and M. M. Deshmukh. - **Phys. Rev. B** 79, 121311(R) (2009).