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Soumyodeep Dey

Education

Academic Qualifications

- 2016–2021 **Doctor of Philosophy**, *Indian Institute of Technology, Madras*, Chennai, *Nonlinear optics*
  CGPA:7.57/10
- 2013–2015 **Master of Science**, *Indian Institute of Technology, Madras*, Chennai, *M.Sc. Physics*
  CGPA:7.52/10
- 2010–2013 **Bachelor of Science**, *Ramakrishna Mission Residential College (Autonomous), Narendrapur*, Kolkata, *Physics (Hons.) including Mathematics*
  Marks: 60% (1st class)

Scholastic Achievements

- Recipient of **INSPIRE FELLOWSHIP** sponsored by **Department of Science and Technology (DST)**, Government of India *(2017-2021)*
- Recipient of **INSPIRE SCHOLARSHIP** sponsored by **Department of Science and Technology (DST)**, Government of India *(2010-2015)*

Research Interest

- Fabrication of optical setups for Nonlinear optical measurements
- Supercontinuum generation and its applications
- Structured beam generations and its applications
- Numerical simulations of optical laser pulses
- Cold atom physics and its applications

Notable Projects

- **Masters Project:** *'Spectral Phase Interferometry for Direct Electric field Reconstruction (SPIDER)'*
- **Pre-doctoral Project:** *'Supercontinuum generation for transient absorption spectroscopy'* sponsored by Defence Research Development Organization (DRDO), Government of India

Experimental skills

- Femtosecond amplifier (Model: Coherent Astrella). This laser system can deliver output of $35\ fs$ @ $800\ nm$ and $1\ kHz$ of repetition rate.
- I have five years of experience of working with femtosecond oscillator (TISSA100, CDP) as a part of my PhD work.
- During my PhD work, I made few setups listed below.
  - **Autocorrelation setup :** A technique to measure ultrafast laser pulse durations in femtosecond time domain.
  - **Supercontinuum Generation Setup:** This setup can convert incoming monochromatic laser light in to a broad band light source ranging from $470\ nm$ to $1650\ nm$.
  - **Mach-Zehnder Interferometer:** This setup has been made to characterize phase profile of structured beam including optical vortices.

  While making these setups, I gained experiences about optical beam alignments, hardware interfacing (with LabVIEW, Labjack and Arduino), spatio-temporal matching of two ultrafast ($100\ fs$) pulses and phase matching by angle tuning. I have also hands-on experience on Laguerre Gaussian (LG) beam generation by spatial light modulator and its phase characterization by Mach-Zehnder interferometer.
- I am experienced working with optical chopper and lock-in amplifier to improve the signal to noise ratio.
- I have 2 years of experience in the undergraduate electronics laboratory as a teaching assistant.

Technical and Personal skills

- **Programming Languages:** Python, Arduino, TeX.
- **Industry Software Skills:** COMSOL, Multisim, LabVIEW, Origin Pro
- **Other:** Good soldering skills and making electronic circuits, Can write well organised and structured reports.

Interests and extra-curricular activity

I am interested to learn new programming languages in my leisure time. So far, I became comfortable (and continuing) in many languages such as **C**, **Python**, **PhP**, **HTML & CSS**. As my primary hobby is web development, I am continuing learning few popular library like **jQuery** and **Flask** with python. My secondary hobby includes SPICE simulations (with **NI Multisim**) of electronic circuits and testing them. I also enjoy 3D computer aided modelling with **Blender**.

References

- Up to 3 references available on request

Journal Publications

- *Investigation of thermal nonlinearity due to nJ high repetition rate fs pulses on wrinkled graphene*, **Soumyodeep Dey**, Sudhakara Reddy Bongu, Vijay Kumar Sagar and Prem Ballabh Bisht, **Journal of the Optical Society of America B** Vol. 38, No. 6 (2021); doi.org/10.1364/JOSAB.420119.
- *Study of a dark core beam generated by nonlinear thermo-optical effect*, **Soumyodeep Dey**,

Sailaja Rallabandi, Surendra Singh and Prem Ballabh Bisht, **Optics & Laser Technology** 134, 106652 (2021); doi.org/10.1016/j.optlastec.2020.106652.

- *Broad band nonlinear optical absorption measurements of the laser dye IR26 using white light continuum Z-scan*, **Soumyodeep Dey**, Sudhakara Reddy Bongu, and Prem Ballabh Bisht, **Journal of Applied Physics** 121, 113107 (2017); doi.org /10.1063/1.4978762.
- *Numerical investigations on photonic nanojet coupled plasmonic system for photonic applications*, Tulika Agrawal, **Soumyodeep Dey**, Shubhayan Bhattacharya, Gurvinder Singh and Prem Ballabh Bisht, **Journal of Optics**, In Press (2022); doi.org/10.1088/2040-8986/ac4d73
- *Probing heteroatoms co-doped graphene quantum dots for energy transfer and 2-photon assisted applications*, Vijay Kumar Sagar, **Soumyodeep Dey**, Shubhayan Bhattacharya, Pooria Lesani, Yogambha Ramaswamy, Gurvinder Singh, Hala Zreiqat and Prem Ballabh Bisht, **Journal of Photochemistry and Photobiology A: Chemistry** 423, 113618 (2022); doi.org/10.1016/j.jphotochem.2021.113618.
- *Optical characterization of graphene-f-o-phenylenediamine and charge transfer interaction with organic dye*, Vijay Kumar Sagar, Shubhayan Bhattacharya, **Soumyodeep Dey** and Prem Ballabh Bisht, **Carbon** 166, 15-25 (2020); doi.org /10.1016/j.carbon.2020.05.026.

Conference Proceedings

- *Generation of supercontinuum with nJ pulses in 450-1700nm range*, **Soumyodeep Dey**, Sudhakara Reddy Bongu, and Prem Ballabh Bisht, **13th International Conference on Fiber Optics and Photonics**, (2016); doi.org /10.1364/PHOTONICS.2016.Th3A.30.
- *Thermal and optical nonlinearity due to broadened femtosecond nJ pulses at high repetition rate*, **Soumyodeep Dey**, Sudhakara Reddy Bongu, and Prem Ballabh Bisht, **AIP Conference Proceedings**, 2244, 060006 (2020); doi.org /10.1063/5.0009060.

Conference Presentations

- *Zero dispersion wavelength shift in solid core photonic crystal fibre*, **S. Dey**, S. R. Bongu and P. B. Bisht in **National Laser Symposium (NLS-26)**, BARC, Mumbai, Dec-19-24, (2017) *(Poster Presentation)*.
- *Supercontinuum generation in photonic crystal fibre on pumping with fs laser pulses*, **S. Dey**, S. R. Bongu, P. B. Bisht in **International Conference on Advancement in Science and Technology (ICAST-2018)**, Visva-Bharati, Santiniketan, India, September 3-4, (2018) *(Poster Presentation)*.
- *Effects of High Repetition Rate Ultrafast Laser Pulses on Spatial Self-phase Modulation*, S.Dey and P. B. Bisht, in **National Laser Symposium (NLS-29)**, Shri Vaishnav Vidyapeeth Vishwavidyalaya (SVVV), Indore, Feb-12-15, (2021) *(Oral Presentation)*.

Workshop Attended

- Participated in the **Science and Technology Exhibition 2011** organized by the **IEEE Calcutta University Student Branch**, Calcutta University, Kolkata, West Bengal, India.
- Participated in a **UGC sponsored National Seminar on Quantum Mechanics: Inception, Evolution and Future** organized by **Department of Physics, Narasinha Dutta College, Howrah** in collaboration with **Seth Anandram Jaipuria College**, Kolkata in a three-day

workshop.

- Participated in **West Bengal Science & Technology Congress** in a two-day workshop organized by **Ramakrishna Mission Residential College (Autonomous), Narendrapur** in collaboration with **West Bengal Science & Technology Department, Government of West Bengal.**