

Advertisement for Postdoctoral Associate (Research Associate- I) position in OUSUMS lab
<http://www.physics.iisc.ac.in/~aksy/>

Project Summary

The project is based on enhancing the brightness of single photon emitters (SPEs) hosted by two-dimensional semiconductors (MoS₂, WSe₂, and hBN) via cavity coupling, resonant optical excitation, and improved photon extraction. This project is supported by the National Quantum Mission.

Quantum technologies exploit the quantum nature of information for communication and computing. SPEs are critical for photonic quantum computing, where a reliable, bright, and on-demand source of photons is necessary. Recently, we have demonstrated the deterministic creation of SPEs in monolayer MoS₂ via low-energy electron beam irradiation (<https://doi.org/10.1002/adfm.202421684>), also see <https://doi.org/10.1088/2053-1583/acc7b6> for initial work on defects).

Next, we aim to enhance the brightness and purity of SPEs via cavity coupling, resonant optical excitation, and improved photon extraction. Our first focus will be to design and fabricate optimal cavity structures for improved brightness of SPEs. Then, we will integrate SPEs into the cavity structures, followed by steady-state photoluminescence (PL), time-resolved photoluminescence (TRPL), and second-order autocorrelation (g^2) measurements for quantifying brightness and purity.

Responsibilities and Duties

Conduct research experiments mentioned above, analyse data, write reports and manuscripts, mentor undergraduates, and regularly meet with the adviser and research group.

Required Qualifications

Applicants must have a PhD in Physics/Nanoscience/related fields.

Required Experience and Skills

Experience with design and fabrication of optical cavity structures (for example, finite element modelling software and lithography), electron microscope (SEM), CW and ultrafast lasers, mechanical exfoliation and stacking of 2D materials, Photoluminescence spectroscopy, Time-resolved spectroscopy, etc. is necessary. In your CV/resume, please mention experience and expertise regarding using specific instrumentation/software. The format of the CV is given on the next page. Without mentioning the level of expertise, the application will not be evaluated.

Benefits and Salary

Regular training on techniques and career mentoring will be provided. Salary will be as per DST norms for Postdoctoral Researcher/ Project Scientist (56,000 + HRA). Hostel accommodation will not be provided.

Job Type: Full time

Initial 3-month contract, which will be extended as per satisfactory performance and mutual discussions. The applicant should be able to work in the position for at least one year. Beyond one year, extension is subject to performance.

Starting: 1st April 2025 (preferred, but negotiable)

Last date of online application: 17th March 2025

Send your CV/Resume and any additional relevant information to ousumslab.phy@iisc.ac.in. The format of the CV is given on the next page. The subject line of the email must be “Advertisement for SPE postdoc”, otherwise the application will not be evaluated.

Reference letters will be required at a later stage.

CV/Resume

1. Name and full correspondence address:

2. Email(s) and contact number(s):

3. Institution:

4. Date of Birth:

5. Academic Qualification (10th, 12th and undergraduate, postgraduate):

	Education	Year	Subject	University/school board	% of marks
1					
2					

6. Work/Research experience (in chronological order)

S No.	Positions held	Name of the Institute	From	To

7. Equipment/software experience

S No.	Equipment/Setup	Expertise (time spent, judge yourself on 1-5 scale with 1 being no experience, and 5 being expert)
1	Ansys Lumerical FDTD simulator	
2	Fabrication of cavity structures using lithography	
3	Scanning Electron Microscope	
4	Photoluminescence	
5	Optical Setup (free-space optics)	
6	Time-resolved spectroscopy	
7	Second order autocorrelation (g^2)	
8	Mechanical exfoliation and stacking of 2D materials	

8. Professional Recognition/ Award/ Prize/ Certificate, Fellowship received by applicant

S No.	Name of award	Awarding agency	Year

9. Publications (*List of **all** papers published in SCI Journals, in year wise descending order*).

S No.	Author(s)	Title	Name of journal	Vol	Page	Year

10. Google Scholar link

11. Any other information