

I-STEM Software Request - Guide Approval Form

User Details

- Name of Researcher: Biswajit Pal
- User Type: ☒ Ph.D. Scholar ☐ Postdoctoral Researcher ☐ Bachelor's ☐ Masters
- Institution Name : Indian Institute of Technology (IIT) Jodhpur
- Institutional Contact No: 0291 280 1605
- Research Topic: Perovskite materials-based solar cells, photodetectors, and LEDs

Software Request Details

- Software Name: COMSOL Multiphysics
- Justification for Software Request: [Provide detailed explanation of how the software supports your research objectives]

COMSOL Multiphysics is required for my research on perovskite-based optoelectronic devices, including solar cells, photodetectors, and light-emitting diodes (LEDs). My work involves understanding and optimizing charge transport, recombination mechanisms, optical absorption, and thermal effects in multilayer device architectures. The software provides a comprehensive multiphysics simulation platform that allows coupling of electrical, optical, and thermal phenomena, which is essential for accurately modeling perovskite devices. Specifically, COMSOL enables:

- Simulation of semiconductor physics using drift-diffusion models to analyse carrier transport, recombination, and extraction efficiency in perovskite solar cells.
- Optical modeling (using wave-ray optics modules) to study light absorption, interference effects, and thickness optimization of different layers.
- Investigation of device performance parameters such as J-V characteristics, quantum efficiency (EQE), responsivity (for photodetectors), and electroluminescence (for LEDs).
- Thermal and stability analysis to understand degradation pathways and improve device lifetime.
- Design and optimization of advanced architectures such as graded bandgap structures, tandem devices, and bifacial configurations.

Therefore, access to COMSOL Multiphysics is essential for achieving my research objectives and contributing to the advancement of next-generation optoelectronic technologies.

Guide/Supervisor Approval

I, Prof. Ambesh Dixit (Guide/Supervisor Name),

- Confirm that the above-mentioned researcher is affiliated with our institution
- Have reviewed the software request and its relevance to the researcher's academic work
- Approve the software request for research purposes

Approval Confirmation

- I approve the software request
- The software aligns with the researcher's research objectives
- The request meets the institutional research guidelines

Guide/Supervisor Signature: _____

Date: 15/4/26

आचार्य
Professor
भौतिकी विभाग

Department of Physics
भारतीय प्रौद्योगिकी संस्थान जोधपुर
Indian Institute of Technology Jodhpur

Official Stamp/Seal: [Space for Institutional Stamp]

Important Notes

1. This form must be signed and scanned
2. The scanned copy must be uploaded with the software request
3. Electronic signatures are acceptable if from an official institutional email

