

I-STEM Software Request - Guide Approval Form

User Details

Name of Researcher: Abdullah

User Type: Ph.D. Scholar

Institution Name: Indian Institute of Technology Jodhpur, Rajasthan-342030

Institutional Contact No: 0291 280 1195

Research Topic: Investigation of the Toroidal dipole excitation in the Metamaterial through FEM, with Fabrication-Based Verification

Software Request Details

- **Software Name:** COMSOL Multiphysics

Justification for Software Request: The title of my PhD research work is "Study of Toroidal Dipole Excitation in Metamaterials Using FEM and its Validation by Fabrication".

In order to accomplish the above-mentioned goal, I need a complete wave finite element method (FEM) solver which would be capable of simulating the propagation of EM waves, resonance and multipole response including toroidal dipoles in periodic structures of metamaterial unit cells over RF/THz frequency range. The primary simulation tool required for this research is COMSOL Multiphysics, particularly its RF Module, supplemented by complementary modules as needed to support the complete scope of the work. This software employs the Finite Element Method (FEM) to numerically solve Maxwell's equations, making it well-suited for the accurate electromagnetic modelling of metamaterials and meta surfaces. The use of COMSOL via I-STEM will enable me to analyse and optimize the proposed metamaterials geometries and material properties, carry out parametric sweeps with respect to geometry and material parameters, investigate field distributions, and multipole analysis before the fabrication process so that expensive trials can be avoided. The same model will help me correlate simulation results such as transmission/reflection spectra and field distributions with the fabricated samples. This is vital as it is an important part of my goal, which states that "fabrication-based verification" of simulations is required for this project.

Guide/Supervisor Approval

I, Dr. Manoj Gupta,

- 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: Manoj Gupta
04/05/2026

Date: 04-05-2026

सहायक आचार्य / Assistant Professor

विद्युत् अभियंत्रिकी विभाग
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Important Notes

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