

## Application instruction for LIMMS internship FY 2027

### **On “*Theoretical study on electron quantum transport in the ultrastrong light-matter coupling regime toward applications in quantum computing applications*” at Kuroyama laboratory, LIMMS/CNRS-IIS, The University of Tokyo**

#### 1. Internship description

- **Location:** Kuroyama laboratory, LIMMS/CNRS-IIS (IRL 2820), Tokyo, Japan
- **Internship title:** Theoretical study on electron quantum transport in the ultrastrong light-matter coupling regime toward applications in quantum computing applications
- **Internship duration:** 1 to 6 months
- **Accommodation support:** 100 000 yens / month for maximum 6 months (600 000 yens max. per person)
- **Expenses:** Airplane tickets and incidental expenses are **NOT** covered by LIMMS.
- **Contract:** Up to 6 months. An internship contract between IIS-UTokyo and the French school will be finalized, which will define the rules and obligations (both overseas travel accident insurance and liability insurance) during the stay at LIMMS/CNRS, IIS UTokyo.
- **Starting & Ending dates:** The internship should start on the 1<sup>st</sup> of March 2027 or beyond and finish before the 31<sup>st</sup> of March 2028.
- **Visa:** Students who will participate in the program for more than 90 days must have a visa. **An administrative procedure takes about 4 months.**

#### Job Duties

- Conduct theoretical research on quantum electron transport in semiconductor nanostructures coupled to electromagnetic resonators in the ultrastrong light-matter coupling regime.
- Investigate novel quantum transport phenomena and functionalities arising from ultrastrong light-matter interactions, with potential applications in quantum computing technologies.
- Perform numerical calculations and simulations of quantum transport and light-matter coupled systems using Python.
- Conduct finite-element electromagnetic simulations of resonator modes and photonic field distributions using CST Studio Suite and COMSOL Multiphysics.
- Analyse simulation results and discuss their physical implications for the design of quantum devices based on strongly coupled electron-photon systems.

#### Skills and Experience

- Basic knowledge of quantum mechanics, semiconductor physics, or quantum transport is desirable.
- Interest in quantum technologies, cavity/resonator quantum electrodynamics, and semiconductor nanostructures.
- Experience with or knowledge of Python for numerical calculations.
- Experience with COMSOL Multiphysics is desirable.

2. **Please send the following items to LIMMS direction <limmsadm@iis.u-tokyo.ac.jp>**
  1. CV
  2. Motivation letter

➤ Candidates are kindly advised to send LIMMS direction the requested documents with an e-mail **subject “LIMMS XXXX (internship title)” FY2027 followed by the candidate’s full name.** Sending documents with a different e-mail subject might be at risk of being overlooked.
3. **Submission Deadline (Closing date) for applications is 6 November 2026.**

➤ Please note that due to our administrative procedure, we cannot accept your applications AFTER the deadline.

➤ Due to a large number of applications, it is not possible to reply to you if you are not shortlisted. If you have not heard from us within one month of the closing date, please assume that your application has not been successful on this occasion.
4. **Notification of results**

After approval by the screening committee in LIMMS, notification of the acceptance will be sent both to the intern and the host professor of LIMMS.