

### XJTLU-XJTU-UoL Joint Doctoral Supervision Project (Full-time)

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| Reference No.        | SFXJTU2527                                                                                                                                                                                                                                        |
| XJTLU School         | School of CHIPS                                                                                                                                                                                                                                   |
| PhD Programme        | Electrical and Electronic Engineering                                                                                                                                                                                                             |
| Supervisors          | XJTLU supervisor: Dr. Arjun Kumar<br>XJTLU Co-supervisor: Dr. Abhishek Kandwal<br>XJTU Co-supervisor: Professor Di Zhou<br>UoL Co-supervisor: Professor Jiafeng Zhou                                                                              |
| Project Title        | Design of Bi <sub>6</sub> Ti <sub>5</sub> WO <sub>22</sub> -based series of solid solutions or composite dielectric tunable ceramics and related tunable devices<br>基于 Bi <sub>6</sub> Ti <sub>5</sub> WO <sub>22</sub> 的系列固溶体或复合介电可调陶瓷及相关可调器件的设计 |
| Application Deadline | Open until the position is filled                                                                                                                                                                                                                 |

#### **Requirements:**

A UK first-class or upper second-class honours Bachelor's degree and a UK Master's degree with Merit (or their equivalent) are required for PhD admissions. Exceptional candidates holding only a Bachelor's degree may be considered on an individual basis.

Evidence of good spoken and written English is essential. The candidate should have an IELTS (or equivalent) score of 6.5 or above, if the first language is not English.

For more information about entry requirements and admission procedures of PhD programme at XJTLU, please visit:

[Entry Requirement - Xi'an Jiaotong-Liverpool University](#)

[How to Apply - Xi'an Jiaotong-Liverpool University](#)

#### **Other Requirements (if any):**

The candidates should have a background in **materials science, electronic/electrical engineering, physics, or a closely related discipline**. Knowledge or research experience in **dielectric/ferroelectric ceramics, microwave materials, materials synthesis and characterization, electromagnetic simulation (HFSS/CST), or microwave engineering** is desirable. Experience with XRD, SEM, dielectric measurements, data analysis, or scientific programming would be an advantage. Candidates should demonstrate strong **analytical, experimental, problem-solving, and scientific communication skills**, together with an interest in interdisciplinary and international research.

### **Programme Structure and Fees:**

Doctoral students in the joint programme are registered with both XJTLU and the UoL. Upon successful completion of the programme, the students will be awarded a PhD degree from University of Liverpool. During their doctoral studies at XJTLU, students are expected to conduct research at XJTU as visiting students. Additionally, students have the opportunity to apply for a short-term research visit to the UoL if the project requires it.

The joint doctoral programme is offered on a full-time basis, with a typical duration of three to four years. The tuition fee is RMB 99,000 per year.

### **Project Description:**

To cultivate research talents with global leadership, interdisciplinary innovation capabilities, and international research collaboration capabilities, Xi'an Jiaotong-Liverpool University (XJTLU) fully leverages its characteristics of international education and builds upon the long-established strategic cooperation among XJTLU, Xi'an Jiaotong University (XJTU), and the University of Liverpool (UoL). This initiative integrates top-tier research resources to launch a Joint Doctoral Supervision Programme across the three institutions.

This Joint PhD project, jointly supervised by **Xi'an Jiaotong-Liverpool University (XJTLU), Xi'an Jiaotong University (XJTU), and the University of Liverpool (UoL)**, aims to develop **Bi<sub>6</sub>Ti<sub>5</sub>WO<sub>22</sub> (BTWO)-based tunable dielectric ceramics and microwave devices** for next-generation phase shifters and phased-array systems.

The research will investigate **BTWO-based solid solutions and composite ceramics** incorporating low-permittivity, low-loss microwave dielectrics to overcome the high dielectric constant of BTWO while retaining high tunability and low dielectric loss. Controlled doping, compositing, synthesis, sintering, and microstructural engineering will be employed to optimize dielectric and microwave properties.

The project **integrates materials synthesis, XRD/SEM/TEM/EDS/Raman/FTIR characterization, dielectric and ferroelectric measurements, microwave-frequency testing, electromagnetic simulation, and structure–property modelling**. Optimized materials will be integrated into prototype **microwave phase shifters/filters and tunable antenna devices** for experimental validation.

The target is to achieve **>30% effective tunability, dielectric loss <0.01, dielectric constant <100, and microwave operation above 1 GHz under moderate electric fields (<100 kV/cm)**. The project will provide interdisciplinary and international research training spanning **functional ceramics, microwave materials, electromagnetic engineering, computational modelling, and device integration**.

### **Joint Supervisory Team:**

XJTLU Supervisor: Dr. Arjun Kumar

XJTLU Co-Supervisor: Dr. Abhishek Kandwal

XJTU Co-supervisor: Professor D. Zhou

UoL Co-supervisor: Professor Jiafeng Zhou

**How to Apply:**

Interested applicants are advised to email [Arjun.Kumar@xjtlu.edu.cn](mailto:Arjun.Kumar@xjtlu.edu.cn), [Jiafeng.Zhou@liverpool.ac.uk](mailto:Jiafeng.Zhou@liverpool.ac.uk), [zhoudi1220@xjtu.edu.cn](mailto:zhoudi1220@xjtu.edu.cn), [abhishek.kandwal@xjtlu.edu.cn](mailto:abhishek.kandwal@xjtlu.edu.cn), the following documents for initial review and assessment (Please include the project title in the subject line).

- CV
- Two formal reference letters
- Personal statement outlining your interest in the position
- Certificates of English language qualifications (IELTS or equivalent)
- Full academic transcripts in both Chinese and English (for international students, only the English version is required)
- Verified certificates of education qualifications in both Chinese and English (for international students, only the English version is required)
- PDF copy of Master Degree dissertation (or an equivalent writing sample) and examiners reports available