



PhD Position Available

We seek a PhD candidate, who is motivated to join the [experimental condensed matter research group of E. Goldobin, D. Kölle and R. Kleiner](#), to work on the numerical simulation, implementation and experimental investigation of Josephson metamaterials (JMMs). Supervision of Master/Bachelor students is expected. This activity is in the framework of a joint German (DFG) – Russian (RSF) research project. The position is available **immediately** and runs for 3 years.

The main objective of the joint project is to develop a family of tunable Josephson metamaterials (e.g., tunable band gap materials (filters), low-noise (intermediate frequency) amplifiers, etc.) that can be used in various quantum devices and demonstrate the operation of some of them experimentally.

The group in Tübingen will focus on new approaches and designs for implementing electrically (current injection) or magnetically (global or local magnetic fields) tunable JMMs. In the linear regime the aim is to create a JMM with tunable dispersion relation: (a) tunable band gap materials that can work as filters (ideally with the possibility to change both the position and the width of the band/gap) and (b) materials with zero group velocity. In the non-linear regime the aim is to investigate numerically metamaterials similar to Josephson travelling wave parametric amplifiers (JTWPAs). Since meta-atoms (Josephson junctions or SQUIDs), in contrast to real atoms, are not perfectly equal to each other, it is important to study the operation of JMMs depending on the spread of parameters. Output signals will be investigated as function of variation of critical current of one single junction situated at different places of the JMM (relevant for LTSEM imaging). Finally, one of the main objectives of the Tübingen group is to experimentally visualize the operation of JTWPAs, fabricated by Russian partners, using Low Temperature Scanning Electron Microscope (LTSEM).

The [Eberhard Karls University Tübingen](#) is among the oldest public research universities in Germany. In 2019 it was selected as one of the eleven elite institutions within the “Excellence Initiative” of the German Federal Ministry of Education and Research and the German Research Foundation. These strategies aim to promote cutting-edge research, attract top scientists and favour the internationalization and visibility of these universities

A **PhD candidate** with experience in superconducting electronics, microwave technology and numerical simulation will be preferred. A M.Sc. (or Diploma) in physics or related field is required. Applications should include a motivation letter, the candidate’s CV and contact details of at least one academic advisor (or letter of recommendation, if available). Applications should be sent to Prof. Dr. Edward Goldobin (gold@uni-tuebingen.de).

Goldobin/Kölle/Kleiner Group

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