

PhD Student or Postdoc in MBE Growth of Integrated Quantum Light Sources

fixed-term (3+ years / 13 TV-L)

The **Semiconductor Quantum Nanomaterials Group** at the Walter Schottky Institute (WSI), Technical University of Munich (TUM) is looking for a doctoral student or postdoctoral researcher (m/f/d) in the field of integrated photonics of semiconductor-based quantum emitters. The position is for a limited period of 3 years with possible extensions, and the candidate is expected to develop advanced heterogeneous integration schemes of novel III-V nanowire-based single photon sources on Si quantum photonic integrated circuits (QPIC).

Project background

Heterogeneous integration of optically active III-V light sources on silicon (Si) photonic circuits offers the ultimate solution to the scalability and functionality of next-generation classical and quantum light sources. Hereby, III-V nanowire (NW) have emerged as unconventional, yet very powerful photonic systems, leveraging direct on-chip epitaxial integration with perfect position-control, minimal defect generation, and the ability for fully deterministic integration of high-performance quantum light sources. Development of such on-chip photonic sources is in its infancy, but expected to yield ultra-compact quantum emitters for generation of high-efficiency single and entangled photon pairs in quantum communication technologies.

Job description

This project funded by the European Research Council (ERC) aims to develop III-V quantum dot (QD) emitters in photonic NWs embedded onto SOI-based QPICs. This involves a combination of top-down/bottom-up (epitaxial) fabrication methods of well-designed QD heterostructures as well as structural, electronic and optical characterization using the extensive research environment available in our group at the Walter Schottky Institute and Center for Nanotechnology and Nanomaterials. Key tasks aim at the monolithic, site-selective MBE growth of III-V nanowire QDs onto lithographically defined waveguides and resonators, application of advanced microscopy and x-ray scattering techniques, as well as optical characterization of photonic properties using custom-built setups. The scope of this project is at the interface of semiconductor physics, quantum photonics, materials science and electronic device engineering, where you are embedded in a multidisciplinary team.

Candidate profile:

Candidates are expected to hold a M.Sc. degree in physics, electrical engineering, materials science or similar with outstanding academic record and should possess exceptional motivation and creativity combined with very good communications skills and proficiency in English (oral and written). A strong background in epitaxy, state-of-the-art cleanroom fabrication, structure-property correlation and/or optics/photonics of semiconductor nanostructures is an advantage. Hiring will start immediately (09/2022).

Interested applicants should submit their application including cover letter (motivation), CV, list of 3 references and relevant documentation (transcripts, certificates) to the PI of the project by **Email: Gregor.Koblmueller@wsi.tum.de**
PD Dr. Gregor Koblmüller, Walter Schottky Institut, TUM, www.wsi.tum.de

