



## Postdoc on Metamaterials for picophotonic computing

The newly established NanoPico Photonic Computing Group, funded by the BMFTR project *PicPhotMat–Engineered materials for picophotonic analog computing*, follows an innovative approach of utilizing the interaction between structured light and engineered materials for optical computation, with the goal of overcoming current constraints in integration density, computational throughput, and energy efficiency. Contributing to frontier research in picophotonics, the group investigates how to enable ultra-high-density analog optical processing, fundamentally new light-matter interactions, and chip-scale architectures that may serve as the basis for next-generation AI accelerators and neuromorphic hardware. Central to this vision is the development of engineered metamaterials capable of processing information through light-matter interactions that occur at extremely small length scales, far below the capabilities of conventional photonic circuits.

Within this research context, the objective of this postdoctoral project is to lead the subproject on novel metamaterials that enable near-to-far-field information transfer, including the design, fabrication, and optical characterization. These structures will form a foundational building block of the group's picophotonic computing architecture by enabling the readout, transformation, and routing of optical information with a spatial precision unattainable in conventional optics. Moreover, the task of the successful candidate will include the implementation and coordination of scientific projects in the field of photonic computing, the supervision of Master and PhD student projects and the representation of the group at international conferences. We offer a highly interdisciplinary and collaborative research environment with excellent opportunities to develop an independent scientific profile in photonic computing, build a strong network through collaborations within the Abbe Centre of Photonics, and publish in high-impact journals.

**In this postdoctoral project the following techniques and tasks will be applied and developed further:**

- Lead the subproject on novel metamaterials for near-to-far-field information transfer
- Design, fabrication, and optical characterization of nano- and micro-photonic structures
- Nanofabrication using electron-beam lithography, two-photon lithography and other clean-room techniques
- Joint development of optical information processing schemes based on programmable diffractive elements and metamaterials

### Required qualification:

- Doctorate in physics, photonics, electrical engineering, or comparable.
- Experience with metamaterials, nanophotonics, or diffractive optics is required.
- Experience in numerical simulation and nanofabrication is highly advantageous.
- The ability to work effectively both independently and as part of a larger team.

Postdoc supervisor: Elena Goi ([elena.goi@uni-jena.de](mailto:elena.goi@uni-jena.de))

Further information: [www.acp.uni-jena.de/goi](http://www.acp.uni-jena.de/goi)

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