

DC4: Scattering theory for the inverse design of reconfigurable metasurfaces for thermal light management at IR frequencies.

Doctoral position at the [Institute of Nanotechnology](#) at the [Karlsruhe Institute of Technology](#), in Karlsruhe, Germany.

Main supervisor: [Prof. Carsten Rockstuhl \[KIT\]](#)

Co-supervisors/mentors: [Prof. Viktor Asadchy \[Aalto\]](#) and Prof. [Ana Díaz-Rubio \[UPV\]](#)



Objectives:

- Development of a robust numerical workflow for the inverse design of metasurfaces enabling tailored control of thermal radiation in the infrared. The approach combines full-wave Maxwell solvers with gradient-based optimization techniques to target general and application-driven figures of merit.
- Design and numerical characterization of dynamically reconfigurable metasurfaces for active control of dominant spectral bands in thermal emission, with emphasis on modulation depth, spectral selectivity, and physical realizability.
- Design and numerical characterization of chiral metasurfaces aimed at maximizing the degree of circular polarization of thermally emitted radiation in the infrared regime.
- Close interaction with experimental partners within [MetaTune](#) consortium to translate numerical designs into functional devices suitable for fabrication and experimental validation.

This position is part of the [MetaTune](#) Doctoral Network "Reconfigurability using inversely designed metasurfaces", which has been funded under the Horizon Europe Marie Skłodowska-Curie Actions (MSCA) program.

Acquire knowledge: During the development of the thesis, the candidate will acquire deep knowledge on theoretical and computational approaches to thermal radiation by micro-structured photonic materials, as well as on state-of-the-art inverse design techniques.

Design
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Materials
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Fabrication
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Characterization
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[→ Go to the project webpage for more information](#)

Job Description

Doctoral Position



What METATUNE Offers:

- Gross salary from 3.700€/month (44.400€/year), with potential for additional funding depending on your family status.
- Work contract at the KIT for 36 months funded through the MSCA network, with the additional benefits for employees (public and universal health system, free schools, etc.).
- Two 4-month stays, one in Aalto University and one at the Polytechnic University of Valencia are foreseen in the research plan.
- Opportunity to pursue a PhD degree at a leading European university within a collaborative, international network.
- Training program including research-specific and transferable skills courses.
- Active participation in workshops, conferences, and network-wide events to build professional and scientific connections.
- Stimulating, multidisciplinary, and international research environment within a prestigious European training network.

Starting date: September-November 2026.

Deadline for online application: May 31, 2026 (but candidates are encouraged to apply as soon as possible).

Mandatory Requirements:

- You must have a **master's degree** in either Physics or Optics and Photonics or a closely related topic.
- You should **not have a doctoral degree** at the time of recruitment.
- You must not have resided or carried out your main activity (work, studies, etc.) in Germany for more than **12 months in the 36 months** immediately before the recruitment (this is a requirement from the funding authority).
- Strong skills in the **English** language.
- Background knowledge in electromagnetic theory and simulation is a must, and additional knowledge on thermal radiation would be great.

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