Open Ph.D. position as University Assistant without doctorate (75% of fulltime equivalent)

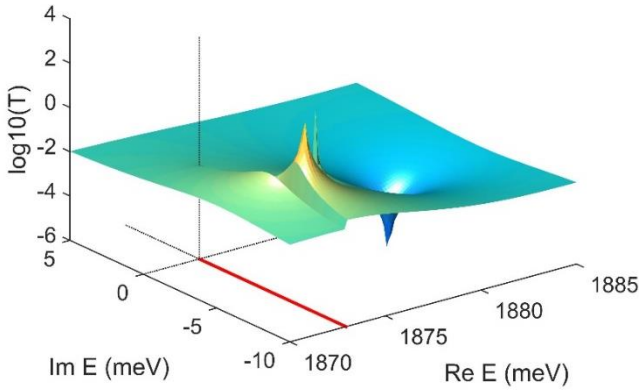
Project title: How accurate is the pole expansion of the scattering matrix?

Where: Theoretical Nanophysics, Institute of Physics, University of Graz, Austria

Project summary:

Metasurfaces are spatial arrangements of subwavelength optical building blocks that allow tailoring the propagation of light in a layer of subwavelength thickness. They have huge potential for applications such as flat lenses, holograms, displays, or classical and quantum sensors.

The building blocks of metasurfaces are mostly designed via numerical calculations, which are often time-consuming and cumbersome. A more elegant way is describing the optical scattering matrix of these building blocks in terms of their resonant states, also known as quasi-normal modes. Thus, the optical response can be often derived faster, and the resonant expansion provides additional insight due to the physically meaningful basis of resonant states.



Several formulations for the resonant expansion of the scattering matrix have been derived so far. However, a thorough comparison of these formulations is lacking. Additionally, these formulations must be extended by cut contributions in certain systems, which has not been achieved in a universal manner – particularly if resonant states and cuts are spectrally close.

This results naturally in the following questions: What are the advantages and disadvantages of the various formulations and how can we include cut contributions in a universal way? We are going to address these questions to obtain a better understanding of light-matter interaction at the nanoscale and to push the limits of metasurfaces further to the next level.

We offer:

- Timely research project in the field of theoretical nanooptics and metasurfaces
- Four-year contract as University Assistant without doctorate as 75% of a fulltime equivalent according to salary scheme B1 (see Austrian University Collective Agreement)
- Work in an international team with collaborations worldwide

Your profile:

- Diploma or Master in physics or related subjects
- Knowledge of electrodynamics and optics
- Good command of English
- Not necessary, but preferable is knowledge in theoretical and numerical nanooptics

If you are interested, please contact Thomas Weiss by phone: +43 316 380 5228 or by e-mail: thomas.weiss@uni-graz.at.

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