

AKjDPG 6: Hacky Hour (joint session AGI/AKjDPG)

In this new format, introduced by AGI and jDPG, tools are presented that can be helpful in your everyday scientific work. Whenever possible a hands-on part will be offered where the tool can be used directly preferably on your own laptop. Furthermore there will be a discussion of the tool where e.g. aspects of compatibility and extensibility can be addressed.

If installation of software is necessary in advance instructions on this and further information in general can be found at <https://hacky-hour.dpg-physik.de>

Time: Wednesday 11:00–12:30

Location: HS ROT

AKjDPG 6.1 Wed 11:00 HS ROT

DFT Tone-extraction made easy: A toolbox to extract all important parameters from a Fourier-Transformed Time-Series — ●TIMON DAMBÖCK and ILJA GERHARDT — light and matter group, Institute for Solid State Physics, Leibniz University of Hannover, Appelstrasse 2, 30167 Hannover

When measuring with a quantum sensor, e.g. a magnetometer, the sensing information is contained in a time-series. The parameters of this 'tone'-response from the sensor is limited to the response of it in the measurement bandwidth. While those parameters can be obtained via a fit in the time-domain, this extraction is both slow and prone to systematical errors due to mis- or overestimation of those parameter. To circumvent this, a Discrete-Fourier-Transform (DFT) is used for the extraction of the parameters. It reveals the amplitude and the noise content in a specific bandwidth – if done correctly. Although conventional fitting methods can be used to reconstruct the amplitude and frequency below their internal resolution in the frequency domain, the use of wrong response functions in frequency space can lead to biases when comparing results with others. To overcome all this, we implemented a toolbox, which relies on estimating the parameters solely from the transformation into frequency domain – without the need for fitting. Hereby we aim to reduce the influence of system-

atical errors, while being fast and resource-efficient enough to assure real-time extraction and tracking of parameters in the lab.

AKjDPG 6.2 Wed 11:45 HS ROT

Set up a quantum simulation from a screenshot — ●GREGORY VARGHESE MANALUMBHAGATH — HQS Quantum Simulations

Setting up quantum simulation is often a daunting task, fraught with intricate parameter configurations and strict adherence to tool-specific conventions. To alleviate this challenge, the HQS Modeling Assistant provides an efficient way of generating requisite inputs, guiding users through module functionalities and assisting in the creation of simulation inputs through the simple and yet familiar interface of chat.

The assistant can perform simulations, as well as analyse results by generating plots and reformatting into tables. The assistant can process structured and unstructured data like figures of quantum circuits, scientific equations, scientific texts from scientific papers thereby reducing the cognitive load on researchers. In this talk, the users will learn how to setup and run a quantum computing simulation by merely uploading a screenshot of equation or image of circuit or just chatting with the HQS Modeling Assistant. This way the focus is shifted from the technical implementation of the scientific paper to the underlying concepts and insights.