

Digital lab book / connection of sample fabrication to a database (SampleDB)

The group of Prof. Salinga at the Institute of Materials Physics is researching novel materials for neuromorphic computers. In particular, phase change materials (PCMs) potentially play an important role for novel computing chips, for example to reduce drastically the energy consumption of artificial intelligence computations. PCMs can be switched between the crystalline and amorphous state within nanoseconds, both electrically and optically. During switching, the electrical resistance changes over several orders of magnitude.

We have a state-of-the-art fabrication laboratory at CeNTech, consisting of an ultra-high vacuum (UHV) facility with a molecular beam epitaxy (MBE) system including a scanning tunnelling microscope (STM), in which films of phase change materials a few nanometres thick can be fabricated with almost atomic precision. We can pattern the films using an ultra-clean thermal scanning probe lithography. The lithography takes place in glove-boxes in which the atmosphere is free of dust, water and oxygen.

During the fabrication procedure valuable data about the process conditions is recorded and must be digitally stored in a sustainable and secure manner. The digital management of our research data is very important for later evaluation and offers enormous advantages compared to traditional ways of archiving data accumulated in laboratories. In this project, the entire history of a sample from the substrate to its final characterization is to be processed digitally in a database that is accessible by various team members. Specifically, the data from the UHV system is to be transferred automatically to our SampleDB setup.

Therefore, our group is looking for highly motivated and committed students to advance the current research data management setup in our fabrication lab and beyond. We offer a position as a

Student assistant (5-10h/week).

We expect...

- interest in fabrication of PCMs (UHV, MBE, STM, XPS) and solid state physics
- interest in programming and software development (e.g. with Python)
- interest in research data management and databases
- personal initiative and high motivation

Your benefits

- Acquisition of skills in important areas such as data science, modern programming (Python) and nano-fabrication
- Acquisition of useful knowledge for later thesis projects in physics and beyond
- Support from experienced staff from the working group
- Collaboration in a young, dynamic team

Have we attracted your interest?

Then contact Prof. Salinga (martin.salinga@uni-muenster.de).