



# A Configurable Application for Measurements, Experiments and Laboratory Systems

A. D. Fuchs<sup>1,2)</sup>, J. A. F. Lehmeyer<sup>1,2)</sup>, P. Oppermann<sup>3)</sup>, H. Junkes<sup>3)</sup>, H. B. Weber<sup>2)</sup>, M. Krieger<sup>2)</sup>

1) FAIRmat, Humboldt-Universität zu Berlin

2) Lehrstuhl für Angewandte Physik, Friedrich-Alexander-Universität Erlangen-Nürnberg

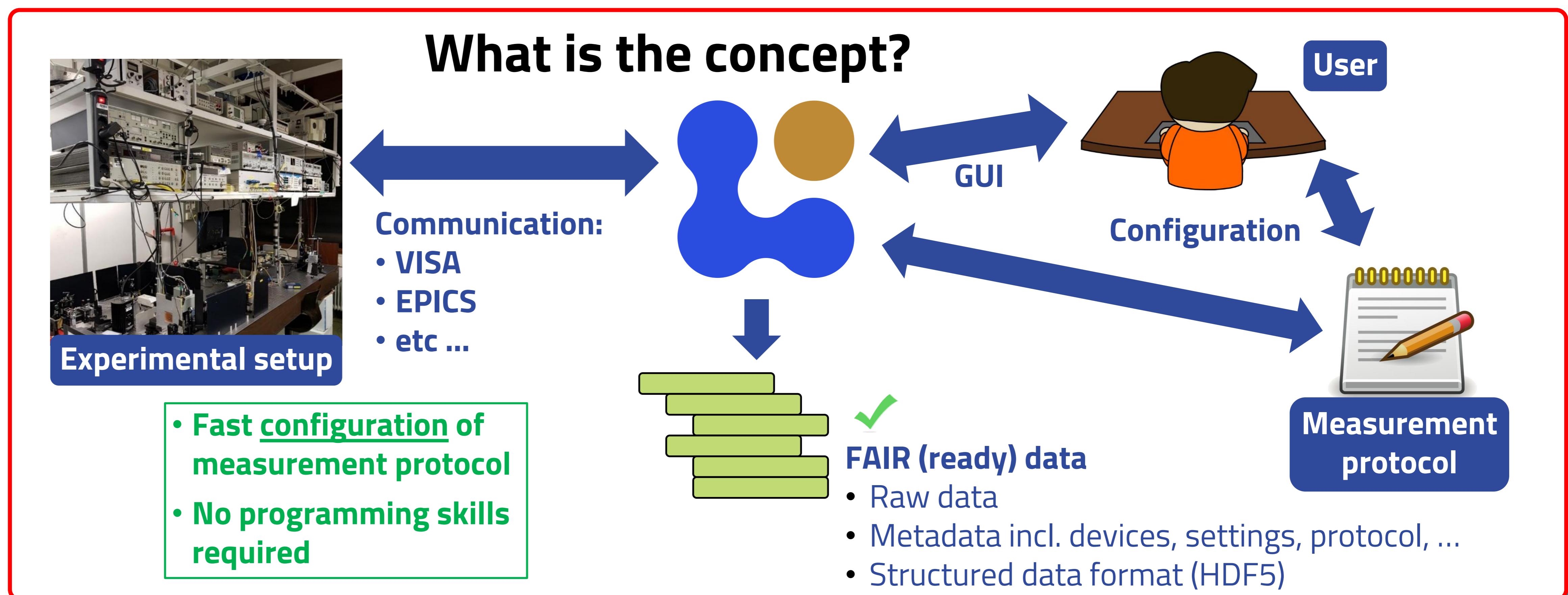
3) Fritz-Haber-Institut der Max-Planck-Gesellschaft (FHI), Berlin



Friedrich-Alexander-Universität  
Naturwissenschaftliche Fakultät



FRITZ-HABER-INSTITUT  
MAX-PLANCK-GESELLSCHAFT



## What does it look like?

The screenshot displays the following windows:

- Manage Instruments - NOMAD-CAMELS:** Shows a list of available and installed instruments (e.g., DAQ\_custom\_device, PID, PID\_EPICS, agilent\_34401, brucker\_magnect\_ni\_daq, demo\_device, gap\_burner\_arduino, keithley\_2000, keithley\_237, keysight\_b2912, keysight\_e5270b) with their versions.
- NOMAD-CAMELS - Configurable Application for Measurements, Experiments and Laboratory-Systems:** Main application window with tabs for **Manage Instruments**, **Manual Control**, and **Measurement Protocols**. It shows a **Sequence** panel with steps like **move up**, **move in**, **move down**, **move out**, and a **Set Channels (Set\_Channels)** configuration panel.
- L\_T\_const\_V\_down - Measurement Protocol - CAMELS:** A detailed view of a measurement protocol named **L\_T\_const\_V\_down** with sections for **General Configuration**, **Sequence**, and **Configuration: Set Channels (Set\_Channels)**.

## What are the features?

- Open source** (hosted on GitHub)
- Ready to start first measurement in **< 30 minutes**
- GUI generates Python** (bluesky) code → customizable
- Complete recording of **metadata**
- Scalable**
  - Local device communication (e.g. VISA)
  - Large-scale distributed control systems (EPICS)

## What's in the data?

The screenshot shows:

- "classical" data:** A tree view of measurement data (TLM.h5) containing matrices and line plots for various parameters like **IV\_2023-03-20T1...**, **Simple\_Sweep\_1**, **SMU\_mesV1**, **SMU\_setV1**, **time**, **time\_since\_start**, and **definition**.
- metadata:** A code editor showing Python scripts for data processing, including **TLM.h5**, **IV\_2023-03-20...**, and **protocol\_over...**.

## Why use NOMAD-CAMELS?

### Customizable

- Setup consisting of several measurement instruments
- Dynamic changes of the measurement setup
- Multiple use-cases for a single setup

### Open source & Community driven

- Drivers written by & for the community

### FAIR data

- Standardized data formats
- Rich metadata

### Easy to use

- Low-threshold entry to device communication
- Save time communicating with devices

## Contact

[www.fairmat-nfdi.eu](http://www.fairmat-nfdi.eu)

[fau-lap.github.io/NOMAD-CAMELS/](https://fau-lap.github.io/NOMAD-CAMELS/)

[github.com/FAU-LAP/NOMAD-CAMELS](https://github.com/FAU-LAP/NOMAD-CAMELS)

[fairmat@physik.hu-berlin.de](mailto:fairmat@physik.hu-berlin.de)

[nomad-camels@fau.de](mailto:nomad-camels@fau.de)

