

# NOMAD CAMELS: Configurable Application for Measurements, Experiments and Laboratory Systems

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NOMAD CAMELS is an open-source configurable measurement software. It is designed for controlling experiments while recording fully self-describing measurement data including rich metadata. It originates in the field of experimental physics, where a wide variety of measurement instruments are used in frequently changing home-built experimental setups and measurement protocols. NOMAD CAMELS provides an intuitive easy-to-use graphical user interface (GUI), allowing users to configure experiments without requiring programming skills or a deep understanding of instrument communication.

From a technical perspective, CAMELS translates user-defined measurement protocols into standalone executable Python code, providing full transparency of the actual measurement sequences. This Python code utilizes *bluesky plans* and *ophyd devices* to perform the actual measurement routine and instrument communication. Inflow of metadata from Electronic Lab Notebooks (ELNs) and upload of data to such notebooks is well supported, enabling a seamless research data workflow. When shared with others, data produced with CAMELS allows for a full understanding and reproducibility of the measurement and the resulting data, in accordance with the FAIR principles.

We will present NOMAD CAMELS, its concepts and discuss the implementation of the bluesky framework. We will demonstrate the benefit of an automated FAIR research data workflow from the source, the experiment, to the highly structured data repository NOMAD Oasis.

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