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UC2: Correlation spectroscopy - XPCS

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The DAPHNE4NFDI initiative is transforming data management for photon and neutron science by implementing FAIR (Findable, Accessible, Interoperable, Reusable) principles across various experimental techniques. At the P10 beamline of DESY, we have deployed SciCat for SAXS/XPCS experiments, enhancing metadata ingestion and data accessibility. In parallel, the development of Xana 2.0 introduces modernized XPCS data analysis with HDF5/NeXus support and parallelized I/O for large datasets.

Expanding these efforts to MHz-XPCS at EuXFEL, we focus on establishing this as a routine technique while embedding FAIR principles. Within DAPHNE4NFDI, we are also developing FUSE (FAIR Unified Scientific Environment)—a cloud-based platform that integrates diverse research data, ensuring interoperability and accessibility for XPCS experiments.

Beyond data management, effective outreach is crucial for maximizing impact. In TA4 of DAPHNE4NFDI, we explore Large Language Models (LLMs) for automating science communication, including event summarization and social media engagement. This AI-driven approach optimizes outreach strategies, making research more accessible.

Our contributions from the University of Siegen demonstrate how advanced data solutions and AI-powered communication are shaping the future of photon and neutron science.

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