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Automated sample identification and registration system for the MOGNO beamline at SIRIUS

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Mogno* is a micro- and nano-tomography beamline at the Brazilian Synchrotron Light Source, SIRIUS. It performs fast tomographies with tender (22 keV, 39 keV) and hard (67 keV) X-rays at resolutions down to 500 nm, supporting classic, 4D (time-resolved), zoom (continuous magnification) and high-throughput experiments. Two stations are available: a nano-station for external users and a micro-station in scientific commissioning, each equipped with an automatic sample-exchange system using robotic arms and magazines holding 21 and 88 samples, respectively.

To enhance automation and user experience under fast-measurement, high-throughput conditions, we developed a sample-registration and cataloging system. Samples are registered via a Data Matrix at a dedicated station using a PyQt desktop interface, which sends requests to a RESTful FastAPI service backed by PostgreSQL. During operation, an orchestrator routine coordinates the magazine, robot arm and code reader to identify each sample holder, fetch its name via the SOA services, and display status on the main beamline control UI. This architecture streamlines workflows, reduces manual errors and enables traceable, high-volume sample handling.

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Footnotes

- Archilha, N. L., Costa, G. R., Ferreira, G. R. B., Moreno, G. B. Z. L., Rocha, A. S., Meyer, B. C., Pinto, A. C., Miqueles, E. X. S., Cardoso, M. B., and Westfahl Jr, H. Mogno, the nano and microtomography beamline at sirius, the brazilian synchrotron light source. Journal of Physics: Conference Series 2380, 1 (dec 2022), 012123.

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