MLZ
Heinz Maier-Leibnitz Zentrum

Data Policy for Experiments conducted at the Heinz Maier-Leibnitz Zentrum (MLZ) in Garching/ Germany

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MLZ is a cooperation between:

JÜLICH Forschungszentrum

Helmholtz-Zentrum hereon

Technical University of Munich

Content

1 Preamble

The Heinz Maier-Leibnitz Zentrum (MLZ) is a leading centre for cutting-edge research with neutrons and positrons. By offering a unique suite of high-performance neutron scattering instruments, scientists are encouraged and enabled to pursue state-of-the-art research in diverse fields such as physics, chemistry, biology, earth sciences, engineering or material science. Our mission is to offer substantial support to scientists from all over the world in addressing the grand challenges facing society today.

The MLZ represents the cooperation between the Technische Universität München and two research centres of the Helmholtz Association, namely Forschungszentrum Jülich GmbH and Helmholtz-Zentrum Hereon, to exploit the scientific use of the Forschungs-Neutronenquelle Heinz Maier-Leibnitz (FRM II) in Garching near Munich.

This document is part of the Terms of Reference of the Heinz Maier-Leibnitz Zentrum. It regulates the responsibilities and rights of the involved parties with respect to scientific research data from Public Research collected at the MLZ user facilities. In this context, MLZ and MLZ staff refers to the partners of MLZ and to staff members of the partners of MLZ.

The partners of MLZ can define additional rules and requirements for Research Data Management and Open Research Data, addressing their specific circumstances and needs.

2 Background and Purpose

Data are a valuable and essential product and resource for research conducted at MLZ. The scientific instruments operated at MLZ are a source for large data sets relevant to national and international research teams. Therefore, Research Data Management (RDM), i.e. organisation, storage, preservation, and sharing of data collected and used in research projects, is pivotal. RDM contributes to the efficient use of resources, reproducibility of research, accessibility of data, good scientific practice and research integrity.

In addition, there are growing requirements imposed by funders and publishers to make research data available as Open Research Data (ORD) in accordance with FAIR principles. MLZ supports the German ORD strategy strengthened by NFDI (Nationale Forschungsdaten Infrastruktur)[1]. It collaborates with national and international initiatives and projects to further promote and develop RDM and ORD.

This Data Policy is based on the framework for scientific data management at photon and neutron facilities of the Strategic Working Group of PaN-data Europe[2] and on the “Draft recommendations on metadata capture and specifications” by DAPHNE4NFDI[3].

This document defines the general principles for Research Data Management at MLZ.

3 Scope of the Data Policy

1. This policy is part of the Terms of Reference of the MLZ, published on the MLZ web page and is thus available to all users. It regulates the responsibilities and rights of the involved parties with respect to scientific data from Public research collected at the MLZ user facilities.
2. Acceptance of this policy is a condition for obtaining access to the MLZ user facilities for internal and external users.
3. It applies to all Public Research experiments for which time is allocated through the MLZ User Office. It does not apply to Proprietary Research activities.

1 https://nfdi.de, see also Murphy, B. M. et al., IUCrJ, 12 (2025), https://doi.org/10.1107/S2052252524011941
2 Götz et al., PaNOSC Deliverable D2.1 (2020), https://doi.org/10.5281/zenodo.3862701
3 Lohstroh et al. (2024), https://doi.org/10.5281/zenodo.12169110

4. In addition to this policy, legal, regulatory or contractual requirements may be relevant (e.g., the federal Act on Data Protection, GDPR) and superseding. This includes requirements from national or international funding agencies (German Research Foundation (DFG), European Commission, etc.).
5. This document pertains to ownership, access and acquisition to and curation and usage of Research Data generated, collected and/ or processed and/ or stored by MLZ (unless exempt or covered by other agreements).
6. The members of the Experimental Team grant MLZ the unlimited, unrestricted, irrevocable, nonexclusive, sublicensable right to use the Research Data to the extent necessary to curate, store and make available according to this Data Policy.
7. No one may or shall attempt to access, exploit or distribute Research Data unless they are entitled to do so under the terms of this document.
8. Deliberate infringements of rules laid out herein may lead to denial of access to Research Data and/ or denial of access to research infrastructures at MLZ and/ or additional legal actions.

4 Research Data Management

4.1 Access and Usage

1. Each experiment is carried out under the direction of a Principal Investigator (PI), who is the main proposer and, thus, the corresponding author of the proposal.
2. By default, the PI grants and MLZ staff organises access to the Research Data collected and stored at MLZ.
3. The PI must keep their contact information in the MLZ User Office System up to date until the embargo period ends.
4. The PI defines the Experimental Team in the MLZ User Office System. The Local Contact is, by default, a member of the Experimental Team. All team members will have access to the data during the embargo period.
5. The PI can transfer their responsibility to another person. This transfer must be documented and announced in written form to the MLZ User Office.
6. The PI should nominate a successor if it is foreseeable that they cannot cover the embargo period. If a PI cannot be contacted, the MLZ Directorate decides on the responsibility in agreement with the Data Steward.

4.2 Data Acquisition

1. Raw Data and associated Metadata are recorded and stored.
2. MLZ strives for automated Raw Data and Metadata capture via the instrument control software used at MLZ.
3. The PI has the responsibility to provide meaningful and complete Metadata. Providing wrong, meaningless, or cryptic Metadata violates professional standards.
4. Where applicable, the use of an Electronic Lab Notebook is recommended.
5. Data taken on or Metadata from user-supplied equipment taken during the scheduled beamtime must be provided to the facility. The use of non-proprietary data formats is recommended.
6. All captured Raw Data and Research Data will be curated in well-defined formats. Metadata will be stored in a catalogue which links the Metadata to the Research Data they are describing.
7. The acquisition and documentation of personal data adhere to the principles of data minimisation and privacy by design.
8. MLZ reserves the right to apply Data Reduction on all Research Data generated at MLZ. For Data Reduction, the focus is on data streams and data sets with high data throughput and/or data volumes. MLZ provides information to PIs, researchers and other interested parties about methods and tools used for Data Reduction.

4.3 Data Retention

1. Services for data archiving provided by MLZ partners aim at data retention periods of at least ten (10) years.
2. On request of the PI, the data retention period can be prolonged for an additional period of five (5) or ten (10) years.
3. After the end of the data retention period, data will be disposed of by the Data Custodian. Before data are disposed of, the PI has to be informed in advance. Upon request from the PI, a prolongation of the data retention period can be granted by MLZ directorate in agreement with the Data Steward.

4.4 Access to Research Data

1. High-level metadata such as Title, Principal Investigator, Experimental Team, Beamline, and Technique may be made public as soon as possible after the end of the experimental session.
2. All Research data obtained from Public Research will be Open Access after an initial embargo period during which access is restricted to the Experimental Team, represented by the PI.
3. The default embargo period is three (3) years, starting at the end of the experimental session. Thereafter, the data will become openly accessible. On written request of the PI the embargo period can be shortened or omitted.
4. The Experimental Report (due for each experiment) will be included in the Research Data and underlies the same embargo rules.
5. The embargo period can be extended twice by a single year on request of the PI. Requests must be submitted in written form to the Data Steward. The Data Custodian will be informed about the decision. Extensions of the standard embargo period of three (3) years must not be in conflict with legal or regulatory requirements or the rules of the funding agency.
6. For embargo periods exceeding five (5) years, a written request must be submitted to the Data Steward, specifying the reasons for the requested prolongation. The MLZ Directorate decides on the request. The Data Custodian will be informed about the decision.
7. It is the obligation of the Data Custodian to ensure that appropriate identification and access control mechanisms are implemented to limit access to Research Data to authorised persons.
8. In exceptional circumstances, the MLZ Directorate can grant access to official committees at any time for the purpose of verifying data integrity and adherence to good scientific conduct.
9. Authorised MLZ staff have access to any Research Data for facility-related purposes (e.g. troubleshooting and improving processes). MLZ will ensure that the confidentiality of such data is preserved during the embargo period.

4.5 Publication of Research Data

1. MLZ intends to provide Persistent Identifiers for all Research Data. Once this is realised, all publications should cite the PIDs of used Research Data.

2. MLZ will release open data under the CC-BY[4] license. Additionally, machine-accessible high-level metadata is released under a CC0[5] license to enable the automated harvesting of datasets.
3. Research Data will be read-only for the duration of its lifetime.
4. Open data are machine downloadable via an open protocol.
5. Data will be stored at archival facilities for long-term curation. Getting access to this data may imply significant waiting time.

5 Liability

1. All services related to the acquisition, transportation, access, processing, storage, archiving and disposal of Research Data provided by MLZ and/or its partners are on a best-effort basis.
2. To the extent permitted by law, MLZ cannot be held liable in the case of unauthorised access, unavailability or loss of Research Data.

6 Termination of Custodianship

1. If, for any reason, MLZ stops acting as a Custodian and/ or maintainer and provider of the Research Data, the facility will inform the PIs concerned in a timely manner, allowing them to make a copy of the stored data, provided MLZ is aware of the e-mail address of the PI.

7 Definitions

1. **Data Catalogue** pertains to a computer database of Metadata containing links to data files that can be accessed by a variety of channels.

4 https://creativecommons.org/licenses/by/4.0
5 https://creativecommons.org/publicdomain/zero/1.0/

2. **Data Custodian** denotes a role responsible for technical environment and IT services to ensure the safe custody, transport, storage, archiving of data and implementation of business rules.
3. **Data Reduction** refers to a set of methods and procedures aiming at reducing the capacity required to transfer, handle and to store data. Examples of data reduction methods are compression and selection. Data reduction methods can be lossless (original data set can be reconstructed) and lossy (original data set cannot be reconstructed, with a possible degradation of data as a consequence).
4. **Data Steward** denotes a role acting as the contact person for Research Data Management at MLZ.
5. **Electronic Lab Notebook** (ELN) denotes a computer program used by scientists, engineers, and technicians to document research, experiments, and procedures performed in a laboratory.
6. **Experimental Report** refers to the report that is due after each experiment and has to be uploaded via the MLZ User Office Software not later than 8 weeks after the end of the experiment.
7. **Experimental Team** includes, by default, the PI, the Local Contact at MLZ, and any other person to whom the PI grants the right to access Research Data related to the research project of the PI. Experimental Team members can be MLZ employees or individuals not employed by MLZ and must be registered via the MLZ User Office.
8. **FAIR** Guiding Principles for scientific data management and stewardship require that data (and other digital assets) are findable, accessible, interoperable, and reusable.[6]
9. **Local Contact** refers to the scientific contact person at MLZ who is in charge of the experiment. The Local Contact is, by default, part of the Experimental Team and is also involved as a co-author in publications based on the results of the experiment
10. **Metadata** is data that provides information about other data. Examples are the scientific and administrative context of an experiment, the experimental team or the experimental conditions.
11. **Open Access** means belonging to the public at large, unprotected by most copyrights or patents and subject to appropriation by anyone. Those open data will be made available under CC-BY for Research Data and CC0 for high-level Metadata.
12. **Persistent Identifier (PID)** is a long-lasting reference to a document, file, web page, or other object.
13. **Principle Investigator (PI)** is the main proposer identified in a research proposal. A PI can be employed at MLZ or an individual not employed by MLZ.

6 https://www.go-fair.org/fair-principles/

14. **Proprietary Research** is defined as that for which users request confidentiality of proposals, data and results. It is often linked to, but not limited to, research funded by commercial entities.
15. **Public Research** refers to research funded or supported by public entities (e.g. research institutions, national and international research councils, public innovation agencies or government departments).
16. **Raw Data** means data collected from experiments. This includes data created automatically or manually by software, staff or external users in order to facilitate subsequent analysis of the experimental data.
17. **Research Data** are the evidence that underpins the answer to the research question. Data may be raw or primary (e.g. direct from measurement or collection) or derived from primary data for subsequent analysis or interpretation (e.g. cleaned up or as an extract from a larger data set), or derived from existing sources where the rights may be held by others. The term also comprises additional information (e.g. information on sample composition, handling and preparation, the proposal, Electronic Lab Notebook records, Experimental Report etc.).
18. **Research Data Management (RDM)** refers to the set of all methodological, conceptual, organizational and technical measures and procedures for organisation, storage, preservation, and sharing of data collected and used in research projects over its life cycle.
19. **Result** pertains to data, intellectual property, and outcomes arising from the analysis of Research Data.