Plan Overview

A Data Management Plan created using DMPonline

Title: Topological defects: from tensor categories to exotic phases of matter

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Project abstract:

A keystone in the understanding of nature, from quantum field theories to exotic states of matter, is the interplay between symmetry and topology. Topological defects provide crucial insight into this relationship. This project aims at deepening that insight, whereby it will also provide novel computational tools. Specific issues to be examined include the construction of state-sum topological field theories (TFTs) with orientation-reversing defects, the extension of string-net models to unoriented surfaces and beyond semisimplicity and finiteness restrictions, and the use of TFTs with embedded defect networks for clarifying the behavior of fracton phases. A long-term goal is a universal state-sum construction of so-called defect TFTs, in which defect networks form an integral part of the input data.

The different tasks will largely be pursued in parallel, in varying collaborations. The work will be based on a systematic exploitation of powerful mathematical methods and tools from the theory of tensor categories as well as higher-categorical structures, not making any simplifying assumptions that could restrict their applicability. Preparations will start during 2022 in combination with ongoing work. The results of the project will be of intrinsic interest in mathematical physics as well as in pure mathematics, but also admit spin-offs in other areas. In particular, substantial contributions to the understanding of topological phases, including fracton phases, are foreseen.

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Topological defects: from tensor categories to exotic phases of matter

General Information

Project Title

Topological defects: from tensor categories to exotic phases of matter

Project Leader

Jürgen Fuchs

Registration number/corresponding, date and version of the data management plan

ID: 115594
28 January 2023
version 1

Version

1

Date

28 January 2023

Description of data – reuse of existing data and/or production of new data

How will data be collected, created or reused?

No data will be collected.
Apart from the contents of scientific publications, no data will be created. These publications are in the area of mathematical physics and abstract mathematics.
Apart from the contents of existing scientific publications that are cited in the new publications, no data will be reused.

What types of data will be created and/or collected, in terms of data format and amount/volume of data?

The only data that will be created are scientific publications.
Each publication is created as a plain text file, from which then a pdf-file is created.
The typical size of a plain text file is a few hundred kilobytes, the typical size of the resulting pdf-file is 1 to 2 Megabytes.
The number of publications created per year is typically between 1 and 5.

Documentation and data quality

How will the material be documented and described, with associated metadata relating to structure, standards and format for descriptions of the content, collection method, etc.?

There is no need for a separate documentation and thus there are no associated metadata.

How will data quality be safeguarded and documented (for example repeated measurements, validation of data input, etc.)?

Since no data will be collected, there is no need for safeguarding or documentation.

Storage and backup

How is storage and backup of data and metadata safeguarded during the research process?

During its creation, the plain text file for a publication is stored simultaneously on at least three different computers at different locations. Once finished, the file is uploaded to the open-access archive arXiv (https://arxiv.org), on which it is stored at 5 mirror sites.

How is data security and controlled access to data safeguarded, in relation to the handling of sensitive data and personal data, for example?

No sensitive or personal data are handled.

Legal and ethical aspects

How is data handling according to legal requirements safeguarded, e.g. in terms of handling of personal data, confidentiality and intellectual property rights?

There are no applicable legal requirements.
During the work on a publication, the resulting file is shared among all coauthors. Once the publication is finished, it is open-access, via the upload to arXiv (as well as later in addition via publication as a journal or proceedings article).

How is correct data handling according to ethical aspects safeguarded?

There are no relevant ethical aspects.

Accessibility and long-term storage

How, when and where will research data or information about data (metadata) be made accessible? Are there any conditions, embargoes and limitations on the access to and reuse of data to be considered?

As already stated, no metadata will be created.

In what way is long-term storage safeguarded, and by whom? How will the selection of data for long-term storage be made?

The storage of scientific work submitted to arXiv is perpetual (and irrevocable).

Will specific systems, software, source code or other types of services be necessary in order to understand, partake of or use/analyse data in the long term?

No.

How will the use of unique and persistent identifiers, such as a Digital Object Identifier (DOI), be safeguarded?

A DOI is automatically allocated to each submission to arXiv.
Once published in a scientific journal, a DOI is normally allocated to the journal version by the publishing company.

Responsibility and resources

Who is responsible for data management and (possibly) supports the work with this while the research project is in progress? Who is responsible for data management, ongoing management and long-term storage after the research project has ended?

The PI is the sole member of this project and has therefore full responsibility during the project. After the end of the project, no further management of the data (scientific publications) is needed.

What resources (costs, labour input or other) will be required for data management (including storage, back-up, provision of access and processing for long-term storage)? What resources will be needed to ensure that data fulfil the FAIR principles?

Since no data will be handled. no costs will arise and no resources will be needed.