Welcome

DLCP
V International Workshop on
Data Life Cycle in Physics
Zoom, 28-29 June 2021

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V International Workshop on
Deep Learning in Computational Physics
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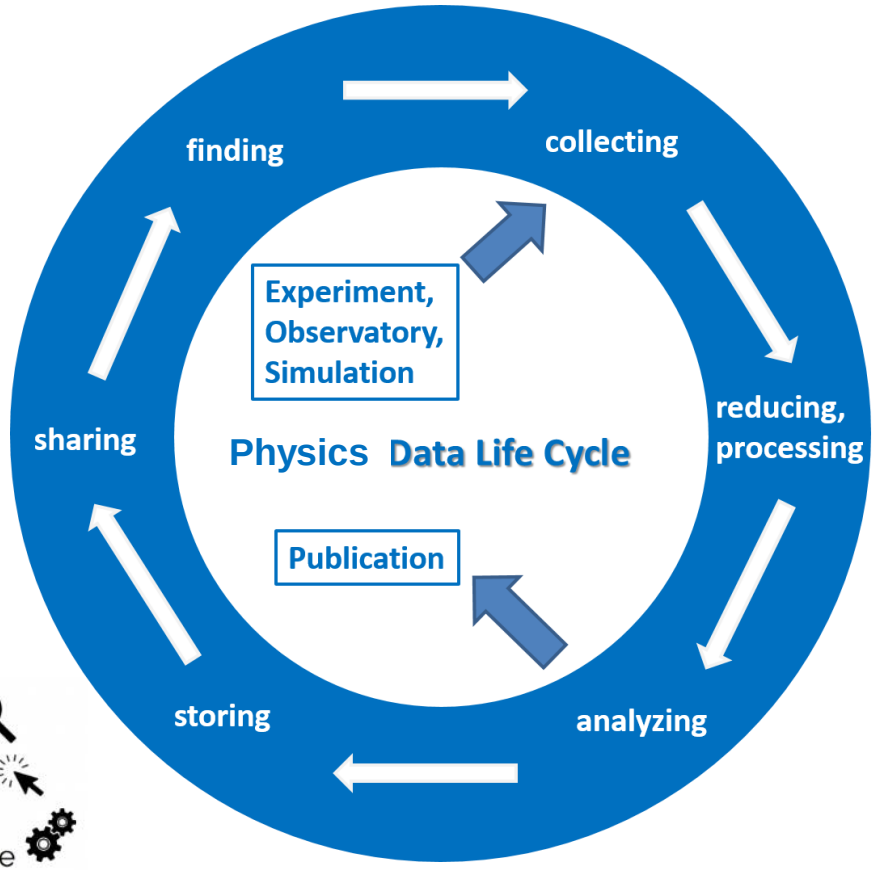
HELMHOLTZ
RESEARCH FOR GRAND CHALLENGES

FAIR Data Lifecycle Concepts and Open Data



Where possible, we need to establish common standards to foster interoperability

Importance of "data stewards" as data lifecycle managers and metadata curators

The lifecycle has to provide a FAIR environment for

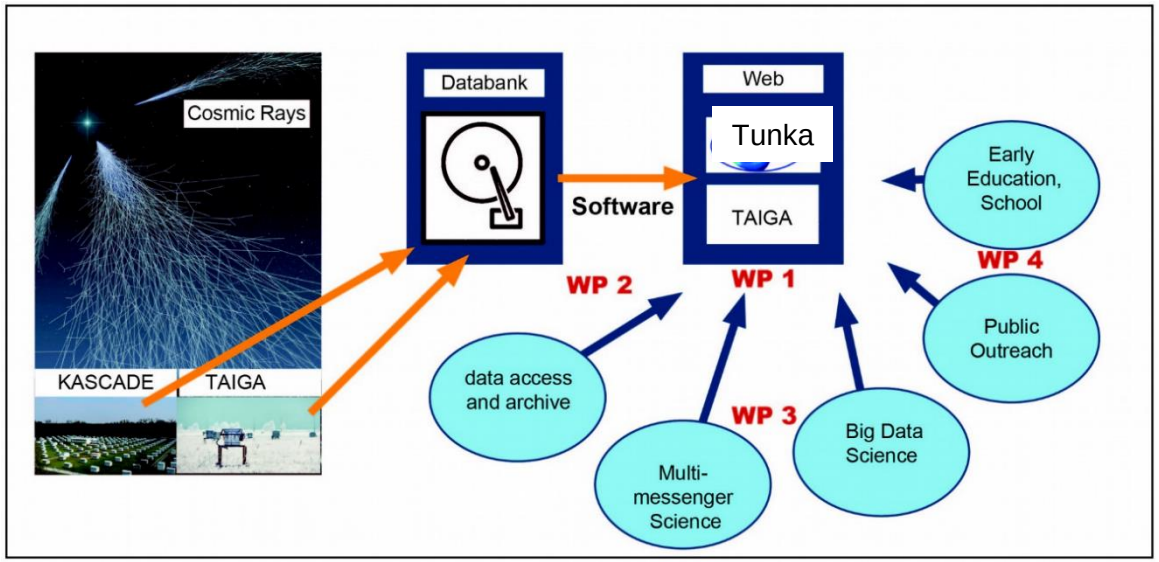
- **(i) data availability**
- **(ii) method development**
- **(iii) data analysis**
- **(iv) big data education**
- **(v) open access**
- **(vi) data archiving**
- **(vii) data mining**

- **Each arrow requires *FAIR* data management**
- **Each step needs appropriate metadata**
- **The cycle includes data, metadata and workflows**

Astroparticle Data Life Cycle Initiative

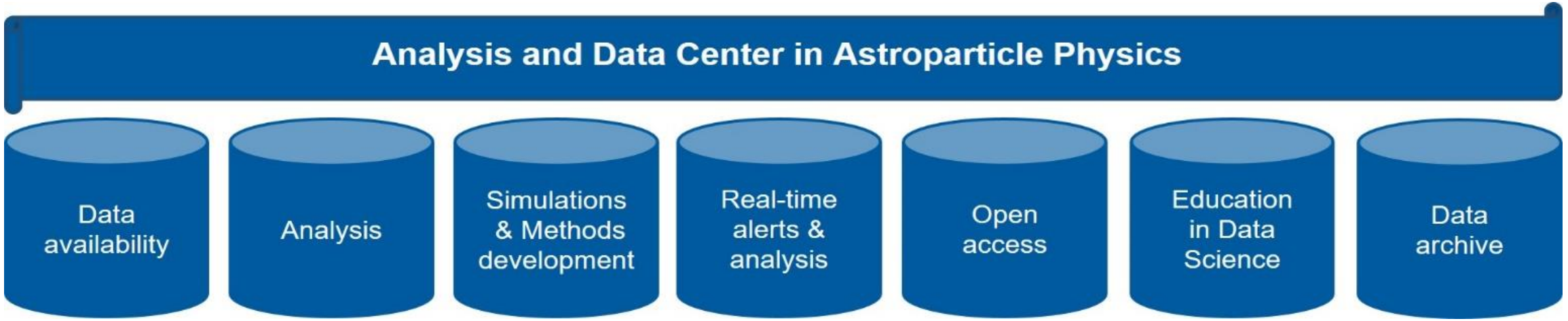
- **Basics**
  - project period 2018-2020 (KIT prolonged 8/2021)
  - funded by Helmholtz and RSF
  - Team leaders: A. Kryukov (SINP MSU) and A. Haungs + A. Streit (KIT)
- **Main targets of the Project**
  - Extension example: data from Tunka and KASCADE-Grande
  - Developing solutions of distributed data storage techniques with a common meta-catalog
  - Development of appropriate machine-learning techniques
  - Perform experiment overarching multi-messenger astroparticle physics
  - Learn to use GridKa environment
  - Creation of an educational subsystem

http://astroparticle.online



https://kcdc.iap.kit.edu

KASCADE KCDC Cosmic ray Data Centre



all FAIR!

Partly realized in individual experiments

in PUNCH4NFDI

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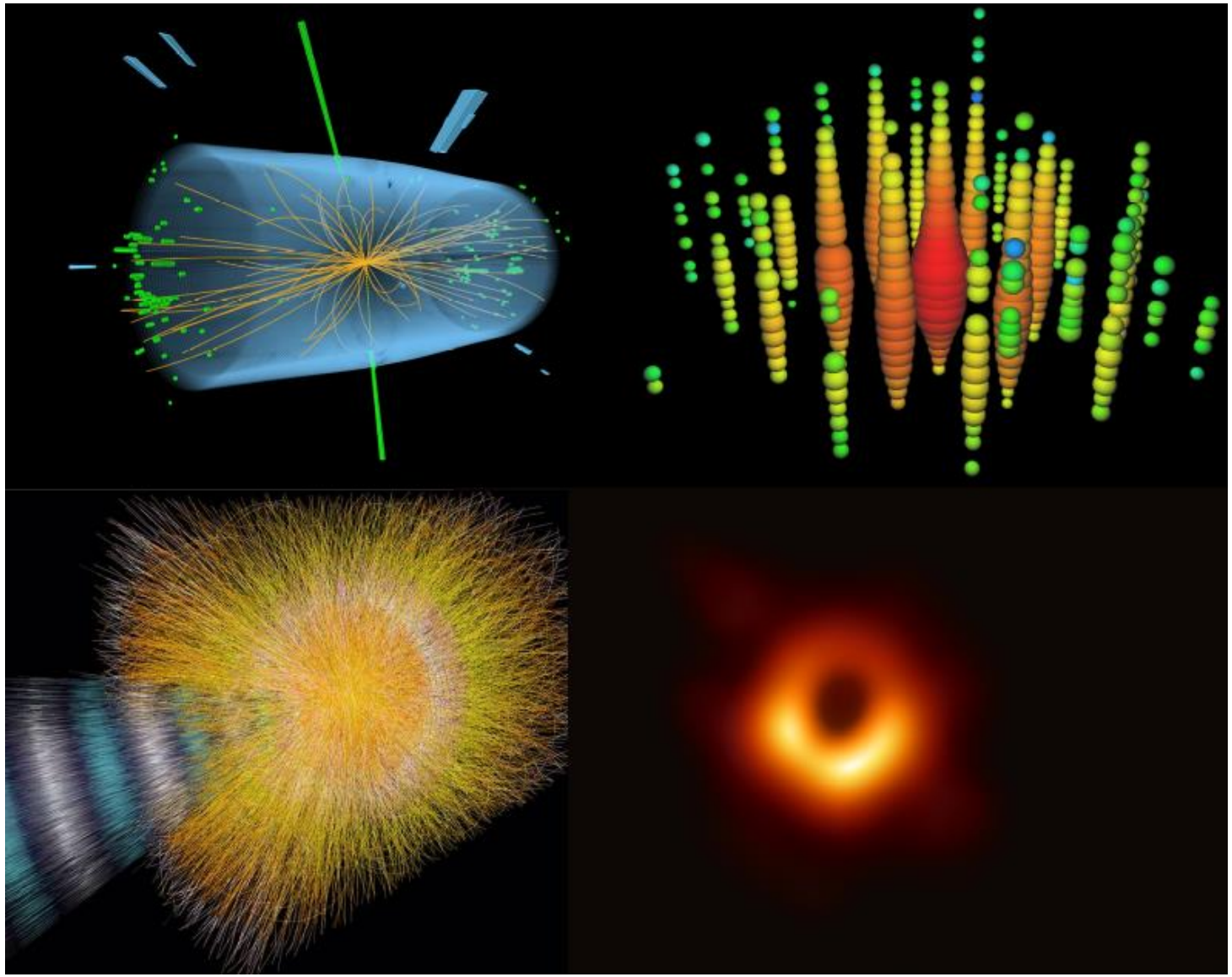


PUNCH4NFDI

Particles, Universe, NuClei and Hadrons for the NFDI

…

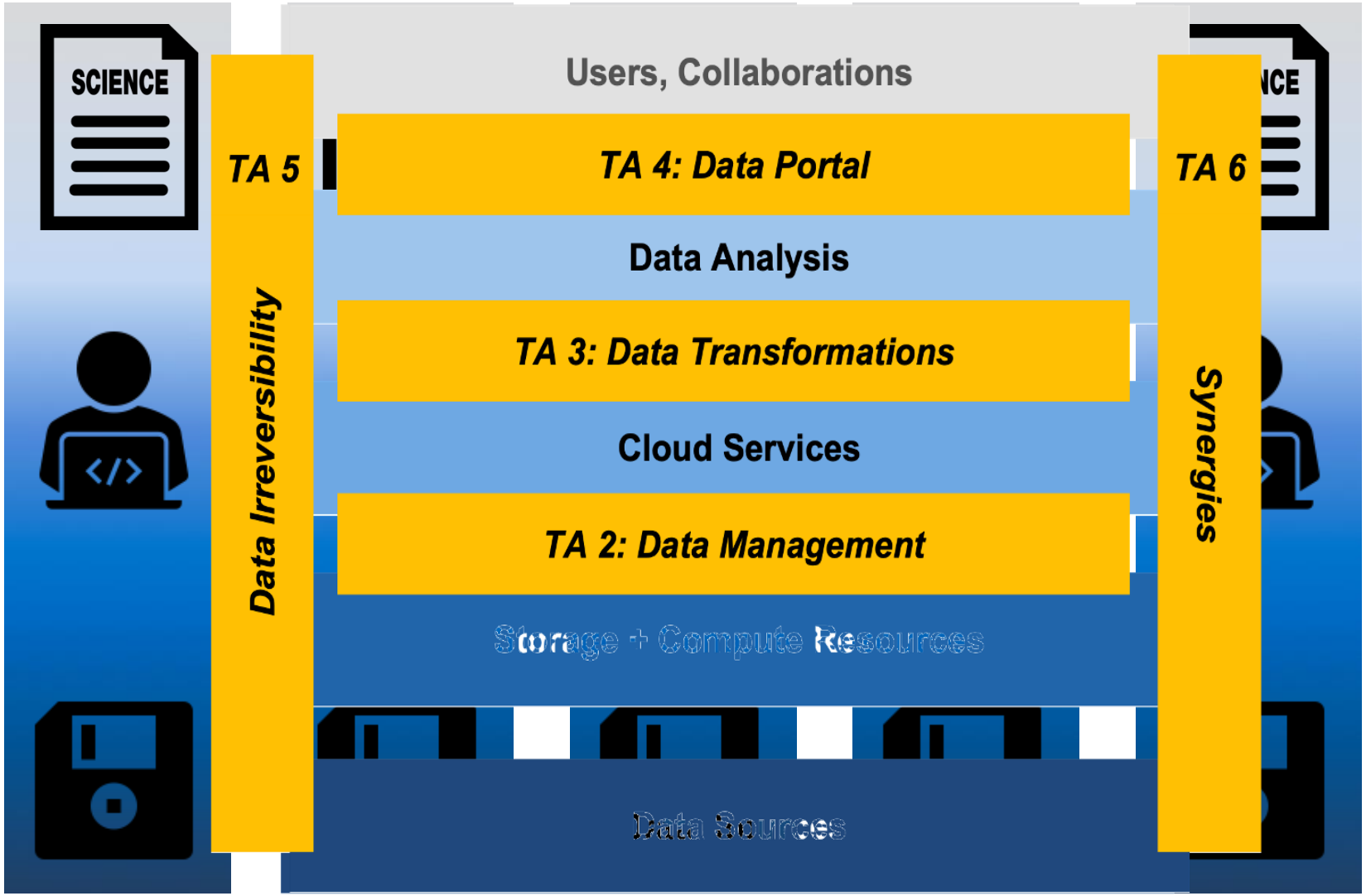
Analysis tools

Compute resources

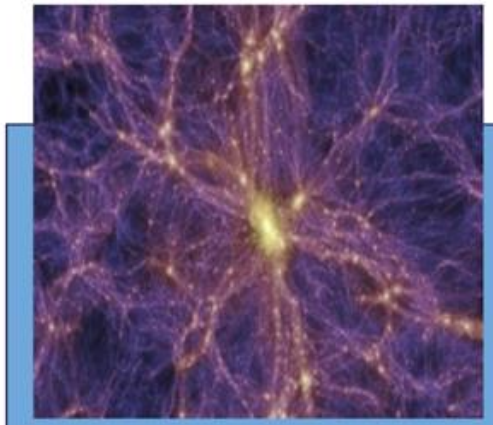
Data access

Data storage

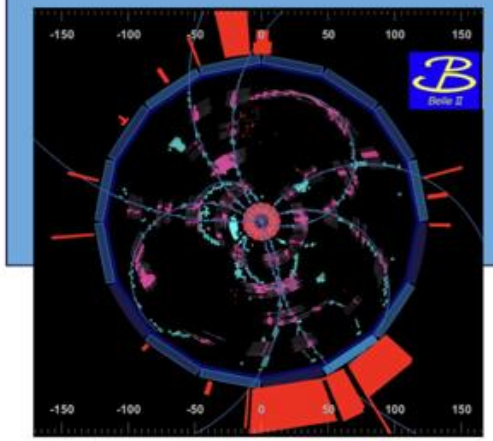
Data sources



Integration of common tools into a data infrastructure based on code-to-data principle



Data and metadata

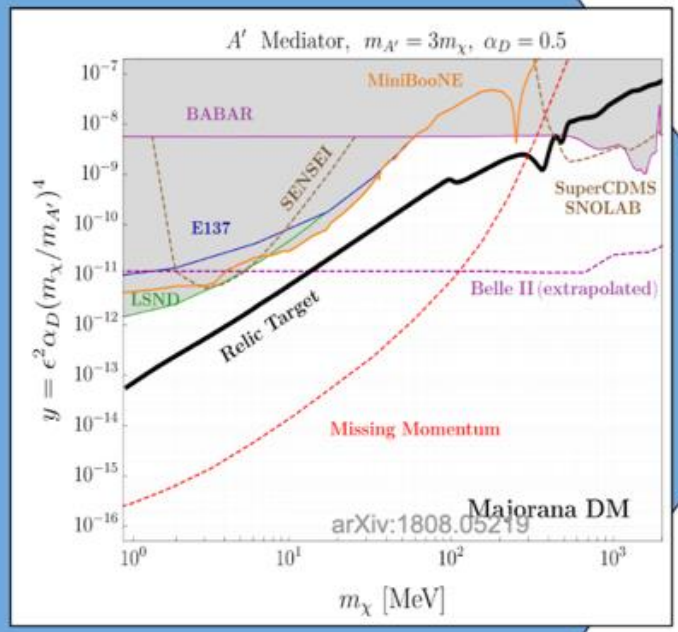


User

Image processing | Particle selection | Data modelling

Statistical methods | Numerical methods + simulations | Machine learning | Across-dataset methods

Scientific result



Tools common to many science fields

Topics

- Modern machine learning method in physics
- Deep learning in cosmic ray astrophysics
- Generative adversarial network for modelling of physics phenomena
- Multi-messenger data analysis in astroparticle physics
- Application in biology and other natural sciences
- Modern trends in machine learning

Focused around the German Russian Astroparticle Data Life Cycle Initiative

Proceedings

- Articles will be published online at CEUR-WS and indexed in Scopus.
- Please note that CEUR-WS focuses on the disciplines of Computer Science, Information Systems, and Information Technology.

- Submissions should be in English and formatted in Springer LNCS style.
- We invite two types of submissions:
  - REGULAR PAPERS describe research not published or submitted elsewhere (10-12 pages).
  - SHORT PAPERS may be position papers, description of research prospects, challenges, projects, ongoing works, or applications (5-9 pages).

Data Life Cycle in Physics.

Proceedings of the 3rd International Workshop on Data Life Cycle in Physics (DLC-2019), Irkutsk, Russia, April 2-7, 2019.
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Data Life Cycle in Physics.

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