

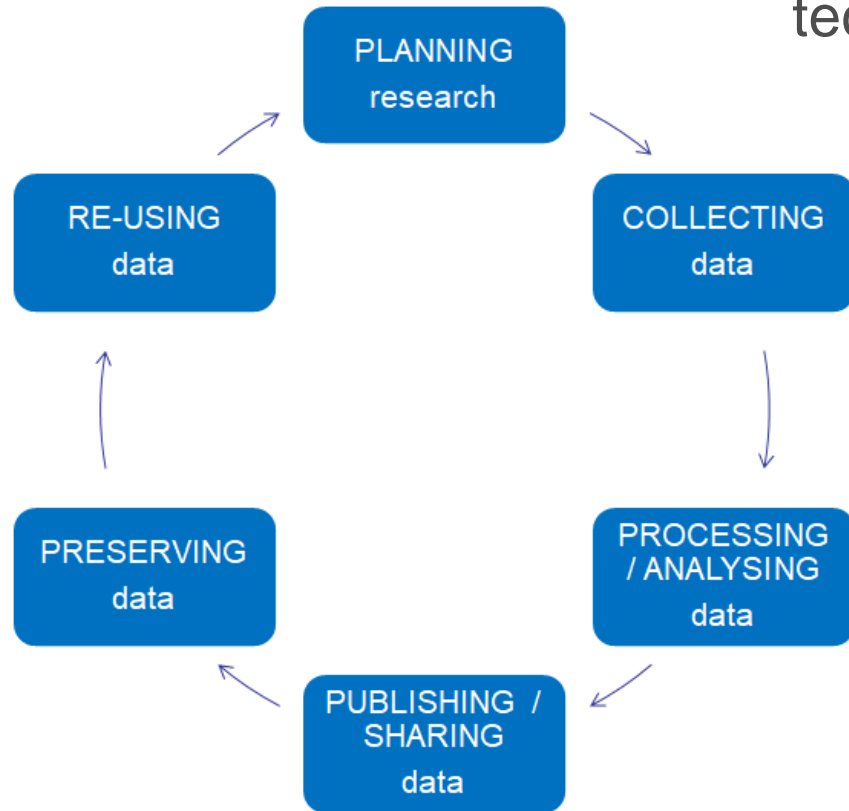
Data Stewardship for Plasma Technology – Atmospheric Pressure Plasma Jets

Markus Becker, Marina Prenzel

Online meeting, 2021-11-26

Overall aim

Research data management in the field of plasma technology in accordance with the FAIR data principles:



To make data and metadata

Findable

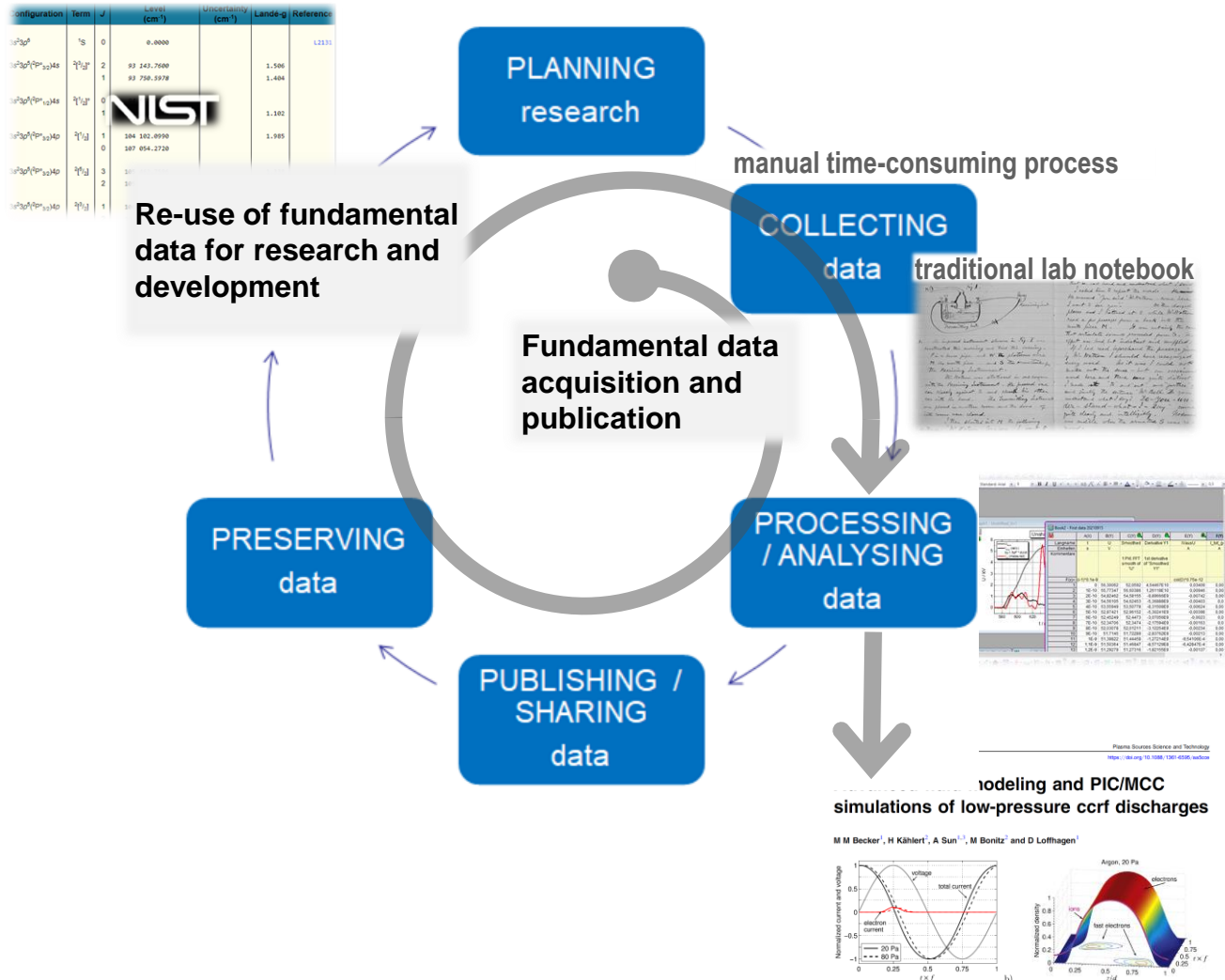
Accessible

Interoperable

Reusable

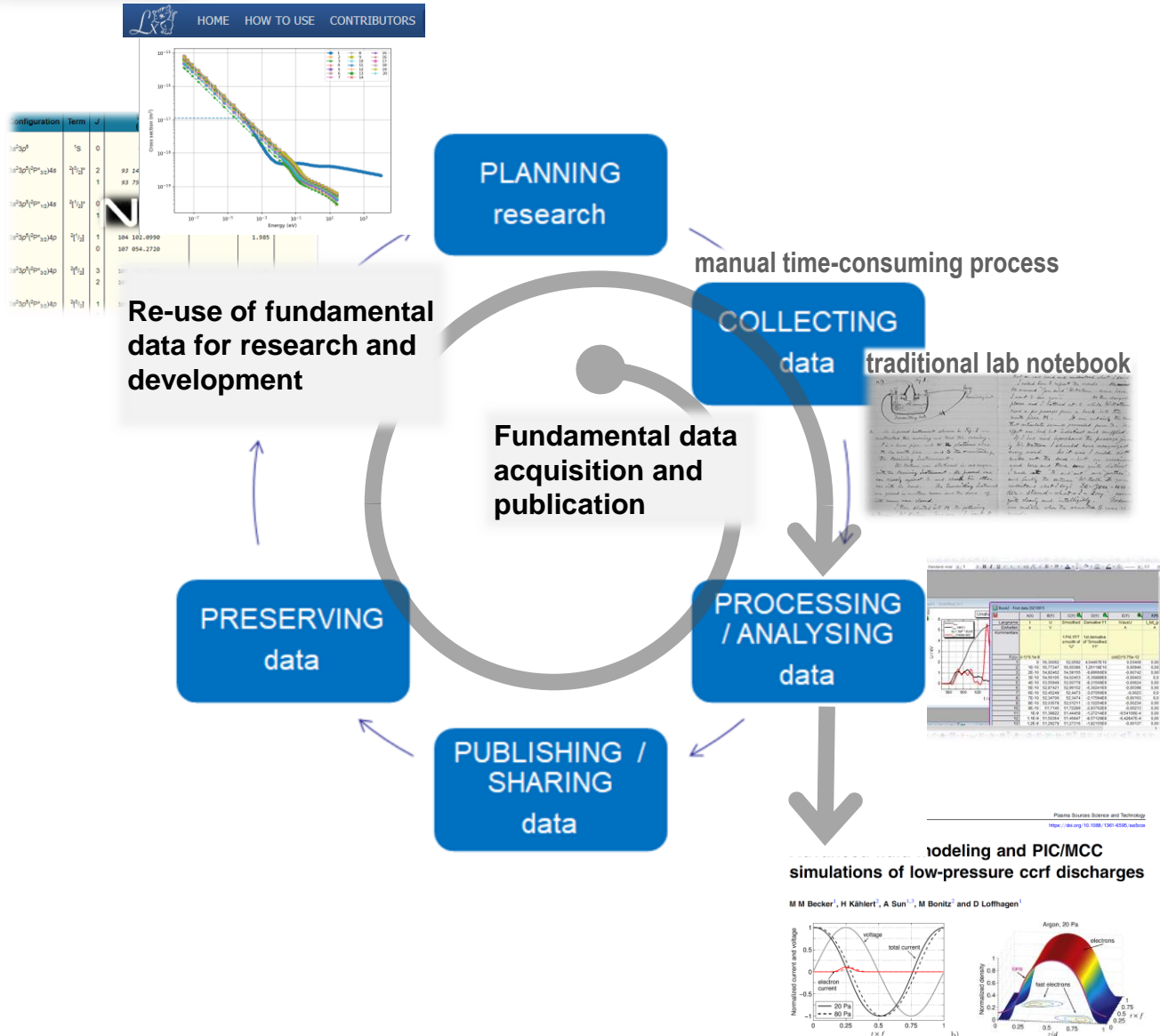
Wilkinson, M., Dumontier, M., Aalbersberg, I. *et al.*
The FAIR Guiding Principles for scientific data management and stewardship.
Sci Data **3**, 160018 (2016). <https://doi.org/10.1038/sdata.2016.18>

What is the *status quo*?



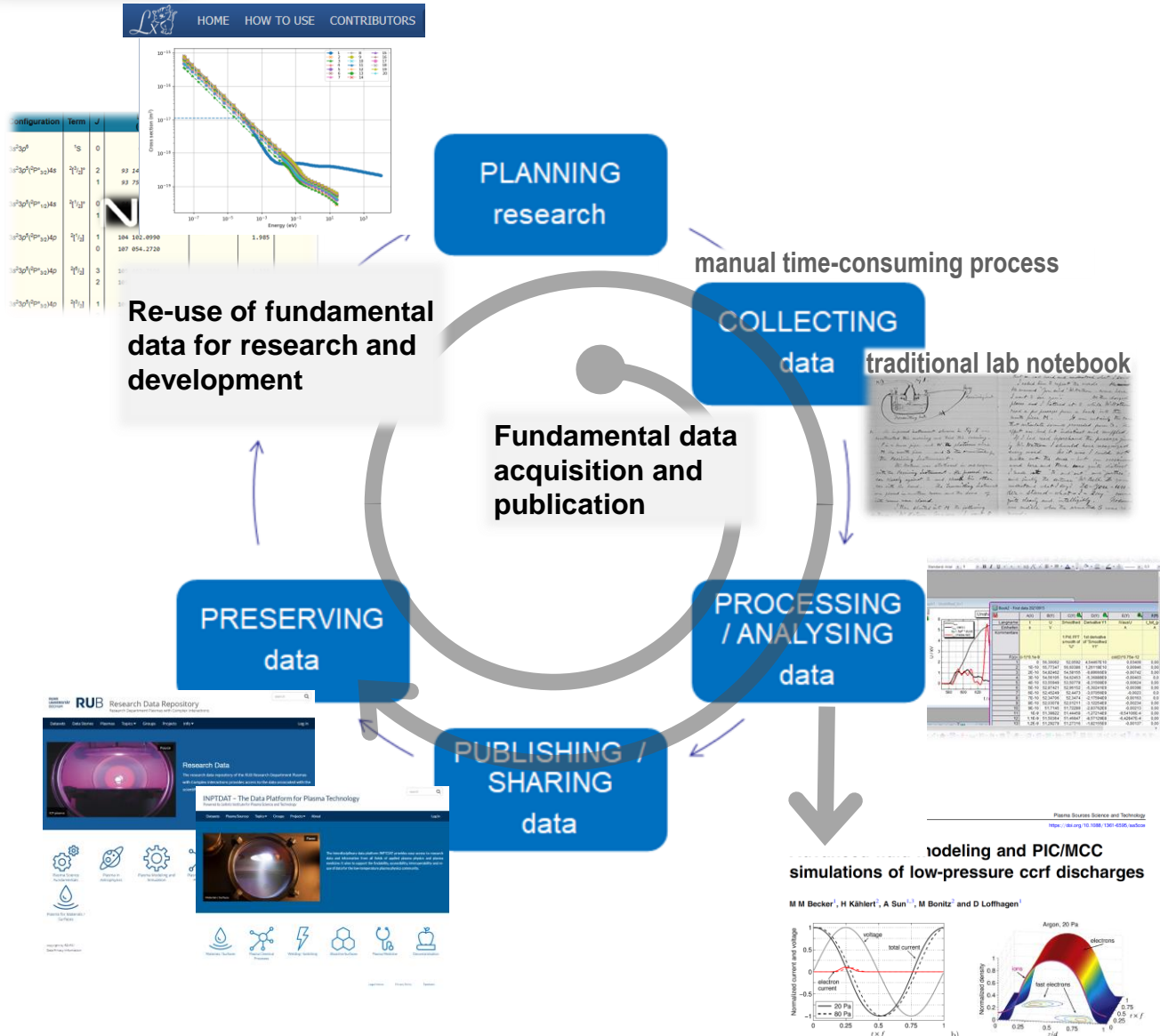
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 - NIST Atomic Spectra Database
 - Springer Landolt-Börnstein Database

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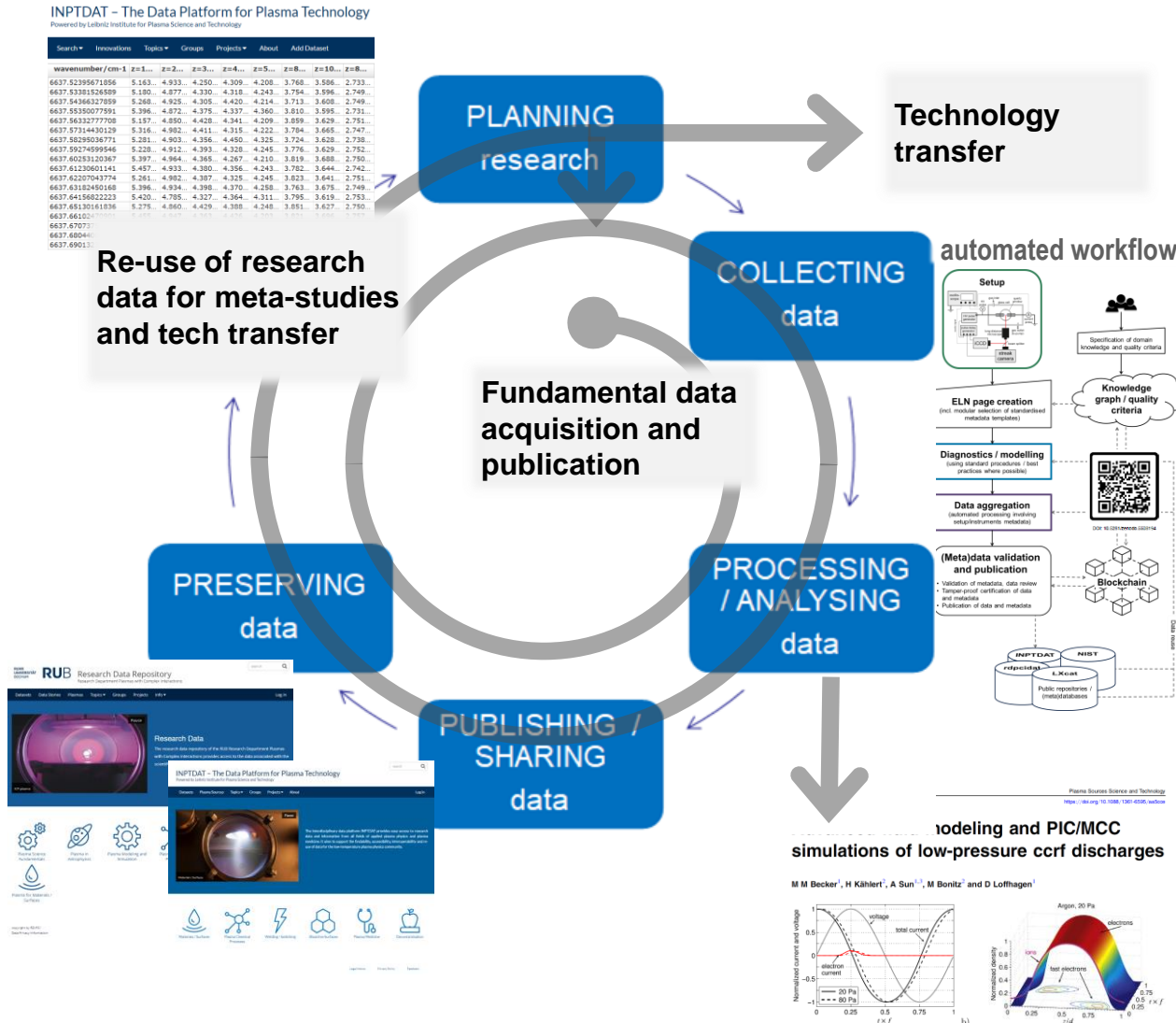
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 - Quantemol-DB

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- *Recently:* data repositories for sharing and preservation of digital datasets
 - INPTDAT and RDPCIDAT

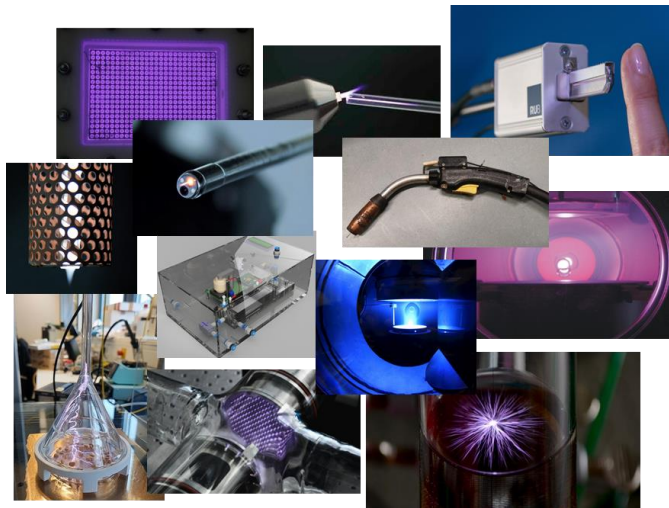
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- *Future requirements:* standardized data, digital workflows, data-driven research and development

Challenges in plasma technology

- Research is in a wide range characterized by small-scale table-top experiments.
- Variety of plasma sources and applications lead to the situation that setups in the different research groups are unique in almost all cases.
- Not only the processes in the plasma but the manifold interactions with gaseous, liquid and solid surroundings are usually important.
- Scientific results can hardly be compared and validated on a quantitative level without an almost complete documentation of the experiments including the diagnostic tools.



Metadata are required to describe, find and re-use data

Suchergebnis auf Amazon.de

URL: https://www.amazon.de/s/ref=sr_nr_n_0?fst=as%3Aoff&rh=n%3A77028031%2Cn%3A178689031%2Cn%3A1981298031%2Ck%3Ajeans&ie=

Stil: Straight (gerades Bein) | Loose Fit | Skinny (enganliegendes Bein) | Slim (schmales Bein) | Tapered (schmal zulaufendes Bein) | Weitere

Filtern nach

Versandoption (Was ist das?)

- ☒ prime
- ☐ Kostenlose Lieferung ab EUR 29 Bestellwert

Kollektion

- ☐ Frühjahr/Sommer 2018
- ☐ Herbst/Winter 2017

Neuheiten

- Letzte Woche
- Letzter Monat
- Letzte 3 Monate

Stil

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Bundweite (Inch)

24	25	26	27	28
29	30	31	32	33
34	35	36	37	38
39	40	41	42	43

Beinlänge (Inch)

27	28	29	30	31
32	33	34	35	36
37	38			

Farbe

Marke

- ☐ Levi's
- ☐ Diesel

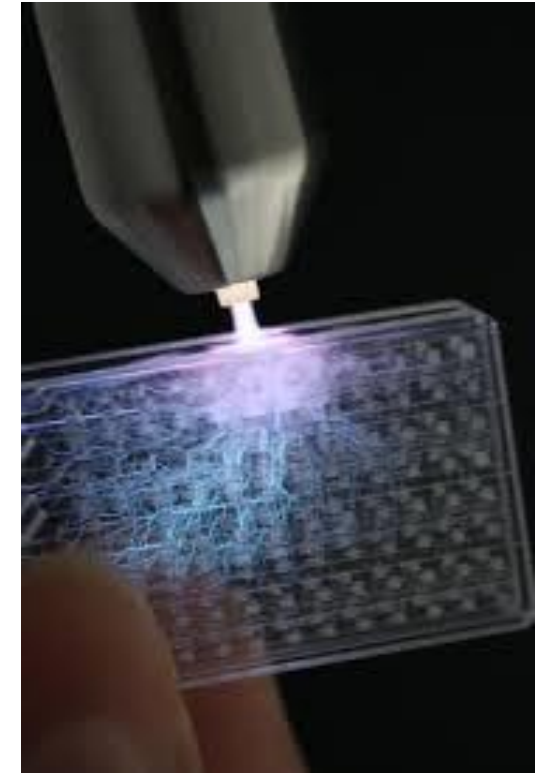
Suchergebnisse:

- Red Bridge Herren Jeans** (Straight, Loose Fit) - EUR 39,90
- ESPRIT Herren Straight Jeans** (Slim) - EUR 42,64
- A. Salvarini Designer Herren Jeans** (Slim) - EUR 34,90
- TOM TAILOR Herren Jeanshose** (Slim) - ab EUR 35,40
- MERISH 5-Pocket Denim Jeans** (Slim Fit) - EUR 39,90
- Rock Creek Herren Jeans Hose** (Stretch Regular Fit) - EUR 39,90
- A. Salvarini Designer Herren Jeans Hose** (Regular) - EUR 31,82
- JACK & JONES Herren Jeanshose** - ab EUR 31,82
- Levi's Herren Jeans 511 Slim Fit** - ab EUR 36,21

Metadata help you to find relevant objects.
e.g. Men - Jeans - Waist - Length - Label

General concept for metadata in plasma technology

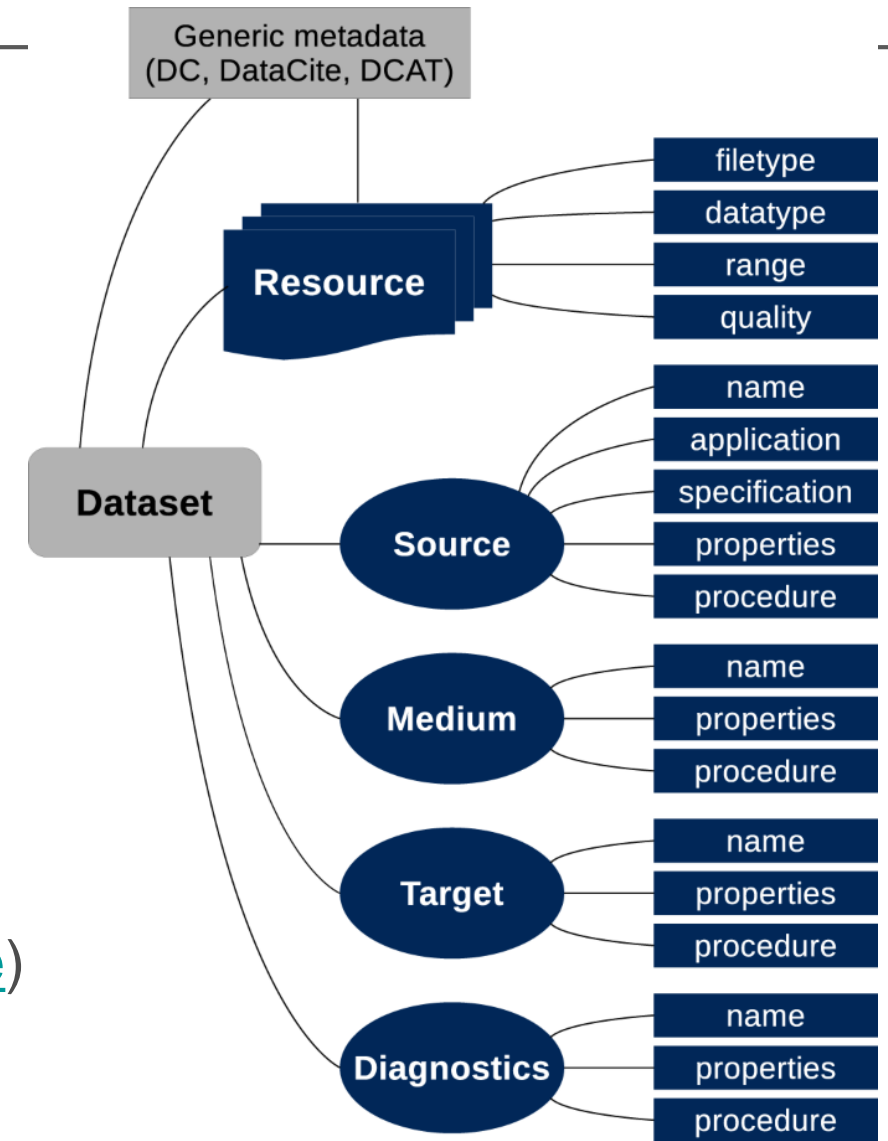
- Plasma
 - ... is generated by a plasma **source**
 - ... is operated with/in a **medium**
 - ... is sometimes used to treat a **target**
- **Diagnostics** (experimental and/or computational methods) are used to study the plasma, medium and/or target
- Stored research data (**resources**) are often useless without information about the whole process
- Specification of the plasma helps to find relevant data sets



Plasma metadata schema

Plasma-MDS

- Metadata schema for plasma science
- Standardized description of
 - plasma source
 - plasma medium
 - plasma target
 - diagnostics / modelling / simulations
 - resources (data)
- Research data repositories implementing Plasma-MDS at INP (<https://www.inptdat.de>) and RUB (<https://rdpcidat.rub.de>)



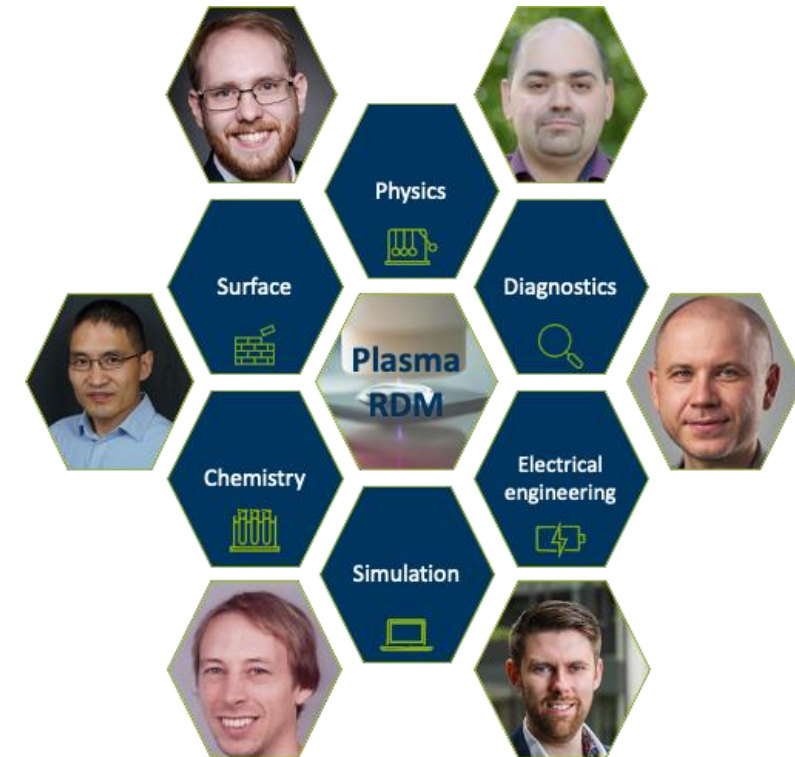
Aim of the INF project at CRC 1316

- Generation of FAIR data within CRC 1316
- Different measures installed to reach this goal
 - Repository as tool for publication of data from journals
 - Electronic lab book eLabFTW planned as prototype to be hosted at IT.Services
- Cooperations
 - QPTDat to develop meta data schemes and to communicate Plasma-MDS to plasma community
 - IT.Services from RUB for workshops & software support
 - Use case in NFDI4Phys (proposal submitted)



INF project at CRC 1316

- Data stewards as responsible persons from each sub field of the CRC 1316
- Exchange with QPQDat concerning meta data schemes
 - Every *third Friday* of the month meeting with INP for meta data scheme evolution at *1pm*
 - Changing topics to cover all field of plasma science
 - Data stewards requested to contribute to the session, scientists are welcome



Why we are here?

Our practical goal

- Further development of terminology and schemas for community ontology

Suggested approach

1. Collaborative editing of drafts (now)
<https://docs.google.com/document/d/1tIWyySpqEV5RHLSesbpS20O5HETyIZwybEDqVlk2mRQ/edit#>
2. Transfer to public Github repository (right after the workshop)
<https://github.com/plasma-mds/plasma-metadata-schema>
3. Re-use of the outcome by anyone who is interested
 - E.g. electronic lab notebooks, databases, automated workflows
4. Further iterations via Github by anyone who is interested to contribute

Expected benefits

- Uniform documentation of experiments
- Traceability and ensuring comparability of data and devices
- Simplified publication and quality assurance of data and metadata

Ontology based community approach

