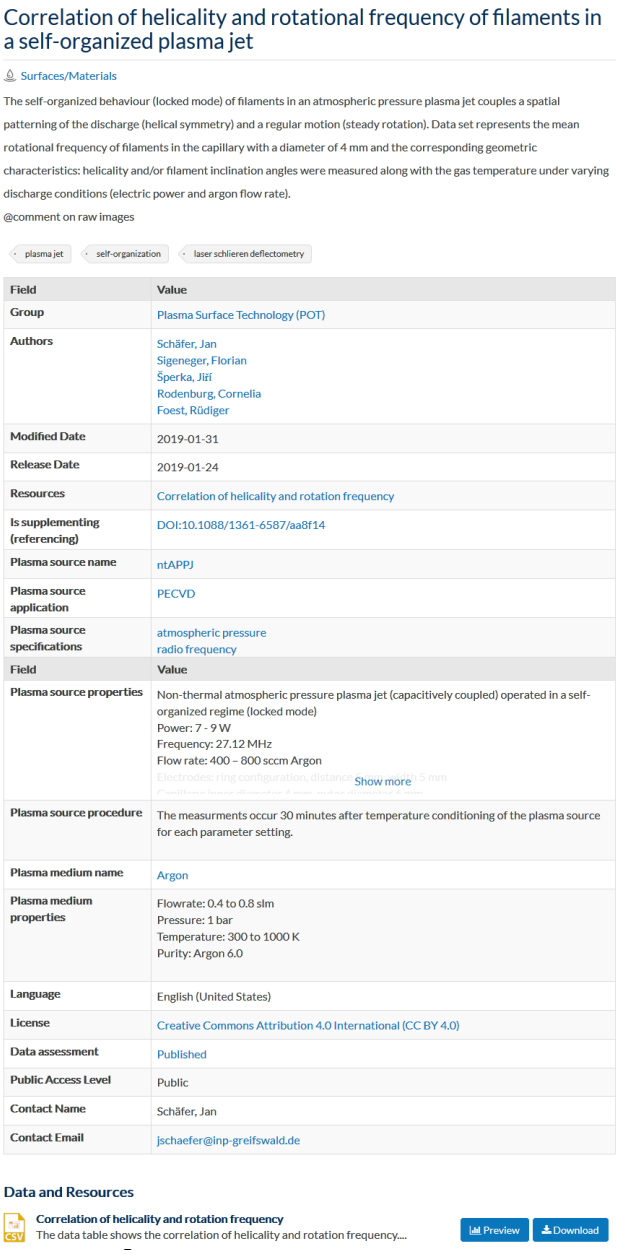
Reuse of research data for plasma processes and applications with Plasma-MDS and INPTDAT

Franke, St., Paulet, I.L., Schäfer, J. & *Becker, M.M
Leibniz Institute for Plasma Science and Technology (INP), Greifswald, Germany
* markus.becker@inp-greifswald.de

The findability, accessibility, interoperability and reusability of research data [1] is a prerequisite for efficient data driven science. Relevant data must be shared with machine-readable metadata containing information on how the data can be accessed, how it can interoperate with applications or workflows for analysis, storage and processing and in which context it can be reused.

In particular, the technological progress of plasma science and applications could be accelerated under these conditions. We report on the new metadata schema Plasma-MDS for the description of research data in applied plasma physics and plasma medicine and the domain-specific data platform INPTDAT. Extending basic metadata schemas like, e.g., Dublin Core, Plasma-MDS can be used for the documentation of data sets in the field of low-temperature plasma science and technology. INPTDAT is a new institutional data platform developed at INP for sharing interdisciplinary research data in this specific field. Using Plasma-MDS for the documentation of data sets, it provides direct and application oriented access to relevant data records. With this, Plasma-MDS and INPTDAT support data-driven discovery in plasma science and extraction of optimum value from data. An example of data and metadata publication with INPTDAT is shown in Fig. 1 for a dataset from a recent publication [2].



Correlation of helicality and rotational frequency of filaments in a self-organized plasma jet

Surfaces/Materials

The self-organized behaviour (locked mode) of filaments in an atmospheric pressure plasma jet couples a spatial patterning of the discharge (helical symmetry) and a regular motion (steady rotation). Data set represents the mean rotational frequency of filaments in the capillary with a diameter of 4 mm and the corresponding geometric characteristics: helicality and/or filament inclination angles were measured along with the gas temperature under varying discharge conditions (electric power and argon flow rate).

@comment on raw images

plasma jet · self-organization · laser schlieren deflectometry

Field	Value
Group	Plasma Surface Technology (POT)
Authors	Schäfer, Jan Sigeneger, Florian Šperka, Jiří Rodenburg, Cornelia Foest, Rüdiger
Modified Date	2019-01-31
Release Date	2019-01-24
Resources	Correlation of helicality and rotation frequency
Is supplementing (referencing)	DOI:10.1088/1361-6587/aa8f14
Plasma source name	ntAPPJ
Plasma source application	PECVD
Plasma source specifications	atmospheric pressure radio frequency
Field	Value
Plasma source properties	Non-thermal atmospheric pressure plasma jet (capacitively coupled) operated in a self-organized regime (locked mode) Power: 7 - 9 W Frequency: 27.12 MHz Flow rate: 400 – 800 sccm Argon Electrodes: ring configuration, distance [illegible] 5 mm Show more
Plasma source procedure	The measurments occur 30 minutes after temperature conditioning of the plasma source for each parameter setting.
Plasma medium name	Argon
Plasma medium properties	Flowrate: 0.4 to 0.8 slm Pressure: 1 bar Temperature: 300 to 1000 K Purity: Argon 6.0
Language	English (United States)
License	Creative Commons Attribution 4.0 International (CC BY 4.0)
Data assessment	Published
Public Access Level	Public
Contact Name	Schäfer, Jan
Contact Email	jschaefer@inp-greifswald.de

Data and Resources

Correlation of helicality and rotation frequency
The data table shows the correlation of helicality and rotation frequency....
Preview Download

Fig. 1: Example of data and metadata publication with INPTDAT.

The German Federal Ministry of Education and Research (BMBF) funded this work under grant mark 16FDM005. The responsibility for the content of this publication lies with the authors.

[1] M. D. Wilkinson et al., Scientific Data 3 (2016) 160018.
[2] J. Schäfer *et al., Plasma Phys. Control. Fusion* **60** (2018) 014038.