- Data Management Best Practices
- Data Management (and Sharing) Plans
- NSTX-U Data Management Plan
- Internal Review of Data
- Princeton Data Commons (PDC)
  - PDC Demonstration
- README template
- Q&A's

- Data management is the practice of collecting, organizing, storing, protecting, and <u>sharing</u> data for use (and reuse)
- FAIR Data Principles:
  - **F**indable, **A**ccessible, **I**nteroperable and **R**eusable for machines
- Best Practices include utilizing:
  - trustworthy data repositories, persistent identifiers (e.g., DOI, ORCID), FAIR practices, clear citations and licensing, data availability statement in publications, etc.

- A DMP/DMSP describes what data will be acquired or generated as part of a research project, how the data will be managed, described, analyzed, and stored, and what mechanisms will be used to at the end of your project to share and preserve the data
- A DMP/DMSP is required for <u>all</u> DOE funded research proposals

> APPENDIX 4: DATA MANAGEMENT PLAN
>
> Provide a Data Management Plan (DMP) as an appendix to the project narrative. Data management plans are not required for applications that only request support for a conference, workshop, or scientific meeting. Subject to the applicable cost principles, applications may request costs necessary for implementing the DMP.
>
> - This appendix should not exceed a page limit of 5 pages including charts, graphs, maps, photographs, and other pictorial presentations, when printed using standard letter-size (8.5-inch x 11-inch) paper with 1-inch margins (top, bottom, left, and right)
> - Do not attach a separate file to Field 12 of the Research and Related Other Project Information form.
> - This appendix will not count in the project narrative page limitation.
>
> The standard requirements for a DMP may be found in Section VIII of this FOA.

- For more information regarding DOE/SC's new guidelines on DMP, see this presentation

- PPPL researchers have the ability to easily create these plans using DMPTool
- Can submit for review/input by our team if you wish to have feedback
- DMPTool has suggested language custom to Princeton/PPPL
- We have suggested language to include in DMP/DMSP to align with best practices at the Lab
- Working on developing a PPPL-specific DOE template in DMPTool, including for NSTX-U
- We cannot write your DMPs, we can help guide you as you know most about your data products

https://dmptool.org
(Login with your Princeton email)

DMP Tool

Center for the Science of Plasma-Enhanced Atomic Layer Processing

Data Types and Sources

The PI (I. Kaganovich) will have overall responsibility for data management for the Center and will monitor compliance with the data management plan (DMP) across each partner institutions. He will work with each co-PI at each institution to ensure that each organization's data management is aligned with this DMP. The individuals are: I. Kaganovich (PPPL), T. Schenkel (LBNL), G. Oehrlein (UMD), B. Koel (PU), A. Mesbah (UCB), J. Chang (UCLA), M. Kushner (UM), V. Donnelly (U.Houston), L. Raja (UT Austin), and A. Capece (TCNJ).

In this project, we expect to collect only non-sensitive digital data. The data to be acquired during the project will not involve human/animal subjects. Thus, we anticipate that all research products that aid in validating research findings can be disseminated freely. We discuss below any concerns with intellectual property and how we intend to safeguards these technologies to protect U.S. interests.

We anticipate that this work will generate at minimum the following research data products:

1. Raw/experimental data:
   - Laboratory science and industrial design configurations of low-temperature plasma (LTP) devices from the LTP Particle-in-Cell code (PPPL)
   - Optical and microwave spectroscopy, material characterization (PU)
   - Plasma and surface science experimental data (PU, TCNJ)
   - Silicon atomic layer etching using VUV light, and will lead to experimental data, including reaction coefficients and product yields, and digital images from scanning electron microscope (U.Houston)
   - Raw characterization data on the atomic layer etching rates of materials for different operating conditions of the reaction chamber featuring an electron-beam source and a remote plasma system. These include real-time ellipsometry and other surface characterization data of materials exposed to radical fluxes and electron beams, along with mass spectrometry, optical emission, and other data obtained from gas phase characterization (UMD)
   - Plasma reactive chemistry and species transport properties data (UTAustin)
   - Data from machine learning-assisted molecular dynamics simulations of atomic layer etch processes (UCB)
2. Computer models and software/code: These will implement algorithms and/or models for (1) LTP processes, (2) reactor scale models for atomic layer processing with VUV, electrons, and infrared radiation, (3) data-driven Artificial Intelligence/Machine Learning for interatomic

- [NSTX-U DMP](#) was developed in line with [PPPL's DMP](#)
- Both the Lab and NSTX-U DMPs were recently updated to reflect best practices, processes, and data services
- Proposals with multiple organizations may need revised DMPs to include all required documents
- Please contact publications@pppl.gov for assistance

NSTX-U

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Data Management Plan

The NSTX-U Data Management Plan (DMP) is a critical component of the program's fundamental research data pipeline, ensuring data standards, validation, security, integrity, data sharing and preservation. The DMP describes the types of data that are measured or produced

- Since the work is funded by Prime Contract, we are required under DOE Order 241.1 to:
  - Publicly share the underlying data supporting our research
  - Complete the internal review process of research data before public release
- If PPPL is leading your research project, we MUST use our own data repository (Princeton Data Commons) - other data repositories CANNOT be used (e.g. Zenodo, DataVerse, Figshare) to ensure it gets internally reviewed
- For NSTX-U, there will be a designated data reviewer/curator

- [Princeton Data Commons](#) (PDC) is the new infrastructure in development with Princeton Library to align the Princeton/PPPL research community with greater Open Access
  - DOI minting as part of the research lifecycle
    - Even draft DOIs to use in papers before publication
  - Cleaner UI/UX
  - Metrics on viewerships and downloads
  - More flexible with micro instances
    - Easier to adapt and evolve with growing Open Access, F.A.I.R., and Lab needs
  - Better support for larger datasets through Globus and AWS
    - For large datasets, please contact publications@pppl.gov to coordinate transfer
    - Can efficiently copy from "P-Drive"

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1. 3D full wave fast wave modeling with realistic HHFW antenna geometry and SOL plasma in NSTX-U

Author(s):   Bertelli, Nicola; Shiraiwa, Syun'ichi; Ono, Masayuki
Type: Dataset
Issue Date: 2022

2. A Reduced Resistive Wall Mode Kinetic Stability Model for Disruption Forecasting

Author(s):   Berkery, J. W.; Sabbagh, S. A.; Bell, R. E.; Gerhardt, S. P.; LeBlanc, B. P.
Type: Dataset
Issue Date: 2017

3. A Riccati Solution for the Ideal MHD Plasma Response with Applications to Real-time Stability Control

Author(s):   Glasser, A.; Kolemen, E.; Glasser, A. H.

Princeton Data Commons Discovery
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Data for "Valuing maintenance strategies for fusion plants as part of a future electricity grid"

Schwartz, Jacob ; Ricks, Wilson ; Kolemen, Egemen ; Jenkins, Jesse

Issue date: 2024

Rights:
Creative Commons Attribution 4.0 International (CC BY)

Cite as: Text BibTeX

Easier dataset citation! 📋

Schwartz, Jacob, Ricks, Wilson, Kolemen, Egemen, & Jenkins, Jesse. Data for "Valuing maintenance strategies for fusion plants as part of a future electricity grid" [Data set]. Princeton Plasma Physics Laboratory, Princeton University. https://doi.org/10.34770/jsyh-gg45

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Rich metadata!

Description:
This contains the data and analysis scripts needed to reproduce the figures in the paper "Valuing maintenance strategies for fusion plants as part of a future electricity grid". It also contains extra data corresponding to all the runs performed, not all of which have data points displayed in the plots. These could be used for re-analyses. Data were created using the GenX capacity expansion and optimization cod...

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Keywords
fusion maintenance power plant
economics

File Types:
gz(4), txt(1)

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Related Identifiers
Requires
https://doi.org/10.5281/zenodo.10607696
Requires
https://doi.org/10.5281/zenodo.10607649
Cites
https://doi.org/10.1016/j.joule.2023.02.006
References
https://doi.org/10.34770/f8em-3c49

Total Size
30.3 MB

- Include in the data availability section of your paper(s)

DATA AVAILABILITY

The data that support the findings of this study are openly available in the Princeton Data Commons at https://doi.org/10.34770/8ad7-jj80.[19]

- Add to your list of references (available through the Discovery portal)

Na, Byungkeun, Robbins, Adam, Yoo, Jongsoo, & Ji, Hantao. Data for "Double-Sided Electron Energy Analyzer for Measurement of Non-Maxwellian Electron Energy Distributions" [Data set]. Princeton Plasma Physics Laboratory, Princeton University. https://doi.org/10.34770/8ad7-jj80

LIVE DEMO!

- When submitting datasets to PDC, a README file is required
  - A README file should contain enough detailed information about the data files to determine what they contain without opening them.
  - We hope to have the README file generated automatically based on the information entered into PDC, but for now you must create a README file
- PPPL README template file available to reuse
  - This template is available on the Publications website
  - Google Doc version available here

- PDC will only be excellent with input from researchers
- This is your opportunity to shape the services for you and your colleagues
- If you have data that you wish to publish, please reach out to us at publications@pppl.gov
- Princeton University Library and the Research Publications and Data Management office are eager to work with you and gather your feedback
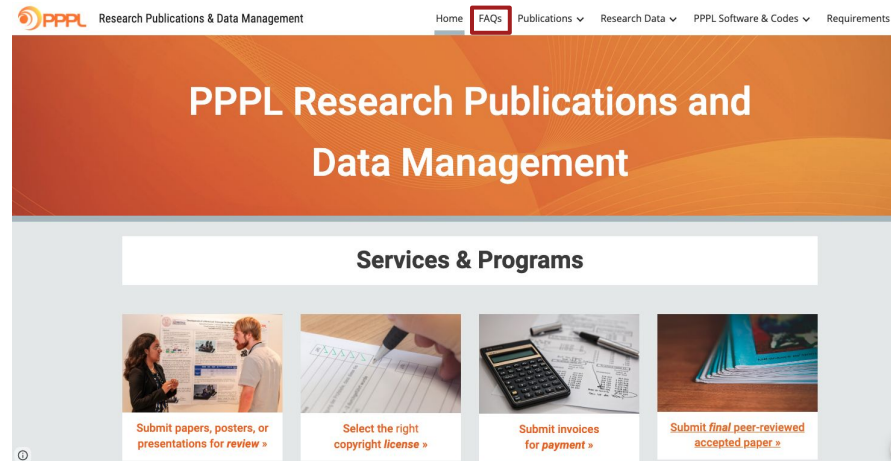
If you have questions, please contact us at publications@pppl.gov

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This really is the <u>most efficient</u> manner to get a response!

Many of your answers are available on our Google Sites:

https://sites.google.com/pppl.gov/publications-and-research-data/

We are offering 1:1 data management assistance!

Contact us to schedule a time

Contact us if you have questions:

publications@pppl.gov