

Alexander Hansen

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Professional Objective

I am seeking an intellectually stimulating long-term or permanent position that will utilize one or more of my skill areas: Scientific research (plasma physics, microwaves, RF), experimental construction and project management, data analysis, and/or programming, including simulations, in a variety of languages.

Employment History**User Liaison/Documenter/Package Maintainer**

The Fink Project

November 2001–Present

Volunteer for the Fink packaging project (<http://www.finkproject.org>), whose goal is to provide a managed method to port and install open-source packages on Mac OS X.

- Assisting users on the Fink mailing lists and IRC channel
- Updating the online documentation--either directly in HTML or generated from XML
- Test-building packages from the package submission tracker
- Reporting bugs
- Maintaining around 500 Fink packages
- Releasing new versions of the fink tool

Style Editor

Central European Journal of Physics

September 2004–Present

Working as an English style editor for the Central European Journal of Physics (<http://www.versita.com/science/physics/cejp/>). My role is to take LaTeX documents that have been accepted for publication and clean up the English style and syntax.

Research Associate

West Virginia University, Department of Physics (Morgantown, WV)

March 2007–October 2010

Research on the Hot Helicon Experiment (HELIX).

Evaluation and implementation of pulsed schemes for launching Alfvén waves into the plasma.

- Implemented a scheme to launch waves synchronized with the data acquisition system.
- Employed a method to integrate pulsed plasma operation with the synchronized data acquisition and wave launch.
- Developed codes (in Octave and Perl) to translate text data files into NetCDF format to simplify access.
- Performed analyses using Octave. Also used SciLab, LabPlot, and Grace.
- Programmed GUIs for data acquisition and machine operation under LabWindows (in C)
- Presented ongoing results at conferences.

Implementation of modifications to a particle-in-cell code in C++ that simulates electrostatic double layers to allow for multiple ion species:

- Benchmarking against the original version.
- Comparing simulation results to experimental observations.
- Support software (mostly Octave) to convert the large flat file datasets generated into NetCDF format, and to visualize the signals as functions of velocity, 1D configuration space, and time.
- Presented results at conferences.
- Have submitted a paper on single-ion species results for publication.
- Performing further runs for two-ion cases.

Multiplexed laser-induced fluorescence for simultaneous measurements of 2 velocity directions at a point.

- Planned system requirements.

- Published initial data.

Time-resolved laser-induced fluorescence measurements of a double layer in pulsed discharges.

- Implementation of timing scheme.
- Software (Octave) to transform the flat file data format into NetCDF format, and to visualize the signal as a function of 1D velocity and time via animation.

Using a hybrid code, provided through a collaboration with Los Alamos National Laboratory, to simulate an Alfvén wave launch scheme.

- Starting with initial modifications.
- Supervising a student in running the code

Additional areas of responsibility included:

- System administration for a Linux (CentOS 5) computer.
- Supervision of undergraduate and graduate students in their activities.

I was a co-investigator on NSF grant PHY-0918526.

Further research activities:

- November 2009: Represented West Virginia EPSCoR at the "Data Visualization: Taking the Presentation of Methods and Results to the Next Level" workshop in Hilo, HI, USA.
- June-July 2009: Worked on laser-induced fluorescence experiments on the Njord experiment at the University of Tromsø, (Tromsø, Norway). I spent time with trying to optimize the setup of a new LIF diagnostic system, and in determining the operational space of the system with respect to the experimental parameters.
- June-July 2008: Visible spectroscopy on the the Princeton FRC experiment at the Princeton Plasma Physics Laboratory. This involved taking time-resolved data for two spatially separated views of the plasma.
- January 2008: attended the CMPD/CMSO Winter School, University of California Los Angeles, USA.

Online Tutor

*Contractor paid by Tutor.com
October 2007–December 2009*

Tutoring high-school and introductory college physics students in an online classroom environment through Tutor.com (<http://www.tutor.com>).

Physics Instructor

*West Virginia University, Department of Physics
January 2008–May 2008*

Instructing a section of first semester non-calculus introductory physics. I was responsible for:

- Developing lectures
- Selecting homework sets out of the textbook
- Writing four midterm exams and a final

Associate Research Scientist

*Columbia University, Department of Applied Physics and Applied Mathematics
August 2000–October 2006*

Performed research at the Levitated Dipole Experiment (LDX), a magnetic fusion plasma experiment sited at MIT, focusing on developing an understanding of how changing the parameters of the microwave heating systems affected the performance of the plasma. Findings were presented at seminars, as posters at conferences, and as journal articles.

- Developed IDL analysis codes, including GUIs, that interfaced with an MDSPlus database.
- Developed an IDL GUI code to visualize magnetic equilibrium data from an HDF dataset.

Responsible for implementing microwave systems to form and heat the plasma.

- A 3 kilowatt 2.45 GHz magnetron system required adaptation for remote operation: integration with an Allen & Bradley Micrologix 1200 process logic controller (PLC) and setting up an optical trigger line using a TTL to fiber optic passive transducer and an active fiber optic to TTL transducer; the TTL signal triggers the source.
- A 3 kilowatt 6.4 GHz klystron system required a similar optical trigger line to the above, and the TTL output was used to drive a solid-state switch circuit; the source is turned on and off via the switch. Integration with the PLC was added.

- A 10 kilowatt 10.5 GHz klystron system, in addition to fiber-optic trigger lines, required assessment and procurement of a 15.5 kV power supply, design of a manually operated AC filament heating supply, and design and implementation of operational interlocks integrated with the PLC to prevent the high voltage from being enabled until the system is ready.
- All of the sources required planning and procuring transmission equipment (waveguide runs). In addition, all required design of appropriate vacuum feedthrough / antenna combination using 3D CAD (Vector Works) and based on standard vacuum flanges.

The above activities involved supervision of undergraduate and graduate students.

In charge of implementing a mechanical lifting system which was used to lift a 600 kg cryogenic dipole electromagnet into its operating position.

- Oversight of the construction of the major components (pneumatically activated hoists).
- Designed the internal support that was used for the initial phase of operation.
- Developed an upgrade to the control system that incorporated limit switches to make operation more user-friendly.
- Performed retrofit of the system to allow use of commercial force sensors as required for experimental operation.

Responsible for the conceptual design and overseeing construction of the walkway that is on top of the LDX vacuum chamber.

I was a co-investigator on the project.

Further research activities:

- July 2002: attended the Snowmass Fusion Energy Sciences Summer Study, Snowmass, Colorado, USA.

Research Assistant

*Physics Department, University of Wisconsin--Madison
May 1994--July 2000*

Research work on the Madison Symmetric Torus experiment, a magnetic confinement plasma fusion device, for doctoral dissertation, focusing on analysis of phenomena related to the kinematics of tearing modes (plasma instabilities), including nonlinear effects.

- Results were presented as posters, workshop talks, papers, and an APS invited talk (2000).
- Developed a technique to analyze an ensemble of spontaneous impulsive events in the plasma.
- Used medium power (tens of kilowatts) power supplies to apply perturbative magnetic fields to interact with the plasma.

Areas of responsibility outside of dissertation research:

- Responsible for maintenance of a system that corrected errors in the experimental magnetic field.
- Supervised other graduate students in a repair of the system.
- Responsible for maintaining a computer program to monitor these errors.
- Developed a simple reconfiguration of the system that improved correction for high-performance plasmas.
- Worked on an extant TTL electronics system for the timing of a near-infrared spectrometer. The system required a couple of changes: line drivers were added due to use of longer coaxial cables than in the original implementation, reworking the timing to eliminate switching noise from acquired data. I supervised an undergraduate for this activity.

Further research activities:

- November 1998: attended the Workshop on Active Control of MHD Instabilities, General Atomics, La Jolla, CA, USA.
- May 1998: attended the Forum for Next-Step Fusion Experiments, University of Wisconsin, Madison, WI, USA
- April 1997: attended the Transport Task Force meeting, University of Wisconsin, Madison, WI, USA
- October 1996: attended the IEA RFP workshop, University of Wisconsin, Madison, WI, USA

Project Grader

*Physics Department, University of Wisconsin--Madison
January 1996--May 1996*

Graded homework assignments and exams for an introductory graduate-level solid state physics class.

Tutor

*Self-employed
September 1994--December 1995*

Tutored undergraduate physics students at the University of Wisconsin--Madison.

Teaching Assistant

Physics Department, University of Wisconsin--Madison

September 1993–May 1994

Covered first and second semester introductory physics. Each week responsible for:

- 4 discussion sections, with homework and a quiz
- two laboratory sections, typically graded via a quiz
- two hours of consultation
- grading exam questions

Education

Doctor of Philosophy in Experimental Plasma Physics (minor in Computer Science and Physics, Distributed), July 2000

University of Wisconsin
Madison, WI

Distinction: Served on graduate curriculum committee.

Bachelor of Arts in Physics, May 1992

University of Colorado
Boulder, CO

Academic awards: Sigma Pi Sigma, Phi Beta Kappa, Golden Key National Honor Society

Professional Memberships

American Physical Society, Division of Plasma Physics

References

Earl Scime

Professor, West Virginia University Department of
Physics

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Jay Kesner

Senior Scientist, Massachusetts Institute of Technology
Plasma Science and Fusion Center

Phone: (617)253-8662

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Stewart Prager

Director, Princeton Plasma Physics Laboratory

Phone: (609)243-3553

Email: sprager@pppl.gov

Computer Skills

General Programming Languages: Perl (5 years), C++ (3 years), C (3 years), Fortran 77 (2 years), Lisp (1/2 year).

High Level Scientific/Mathematical Languages: Maxima (3 years), Octave (4 years), Scilab (2 years), IDL (14 years),
Mathematica (7 years).

Industrial/Laboratory Control: Lab Windows (2 years), RSLogix (1 year).

CAD software: Graphite (2 years), Vector Works (7 years).

Office Software: Openoffice.org (8 years), Microsoft Office (9 years).

Operating Systems: Microsoft Windows (17 years), Linux (15 years), Mac OS X (11 years).

Design and construction

Circuits: Basic circuit design (12 years), Circuit construction (13 years), RF design and construction (2 years),
Microwave design and construction (6 years).

Mechanical: Mechanical design (6 years).

Publications

- ****Invited Talks****

- "Momentum Transport from Nonlinear Mode Coupling of Magnetic Fluctuations", Invited talk presented at 42nd APS-DPP/10th ICPP Meeting, (2000).
- **Journal Articles**
- --As Primary Author--
- A. K. Hansen, Matthew Galante, Dustin McCarren, Stephanie Sears, E.E. Scime, "Simultaneous two-dimensional laser-induced-fluorescence measurements of argon ions", *Review of Scientific Instruments* **81**, 10D701 (2010).
- A.K. Hansen, A.C. Boxer, J.L. Ellsworth, D.T. Garnier, I. Karim, J. Kesner, M.E. Mauel, E.E. Ortiz, "Varying Electron Cyclotron Resonance Heating on the Levitated Dipole Experiment", *Journal of Fusion Energy (Proceedings of Innovative Confinement Concepts Workshop, Austin, 2006)* **26** (1/2), 57 (2007).
- A.K. Hansen, S. Mahar, A.C. Boxer, J.L. Ellsworth, D.T. Garnier, I. Karim, J. Kesner, M. Mauel, E.E. Ortiz, "Initial Results of Multi-Frequency Electron Cyclotron Heating in the Levitated Dipole Experiment", *AIP Conference Proceedings (16th Topical Conference on Radio Frequency Power in Plasmas)* **787**, 395 (2005).
- A. Hansen, D. Garnier, J. Kesner, M. Mauel, A. Ram, "ECRH in the Levitated Dipole Experiment", *AIP Conference Proceedings (14th Topical Conference on Radio Frequency Power in Plasmas)* **595**, 362 (2001).
- A.K. Hansen, A.F. Almagri, D. Craig, D.J. Den Hartog, C.C. Hegna, S.C. Prager, J.S. Sarff, "Momentum transport from nonlinear mode coupling of magnetic fluctuations", *Physical Review Letters* **85** (16), 3408 (2000).
- A.K. Hansen, A.F. Almagri, D.J. Den Hartog, S.C. Prager, J.S. Sarff, "Locking of multiple resonant mode structures in the reversed-field pinch", *Physics of Plasmas* **5** (8), 2942 (1998).
- --As Coauthor--
- Saikat Chakraborty Thakur, Alex Hansen, Earl Scime, "Threshold for Formation of a Stable Double Layer in Expanding Helicon Plasma", *Plasma Sources Science and Technology* **19**, 025008 (2010).
- E.E. Scime, I.A. Biloiu, J. Carr Jr., S. Chakraborty Thakur, M. Galante, A. Hansen, Z. Harvey, S. Houshmandyar, A.M. Keesee, D. McCarren, W.S. Przybysz, S. Sears, C. Biloiu, X. Sun, "Time-Resolved Measurements of Double Layer Evolution in Expanding Plasma", *Physics of Plasmas* **17**, 0550701 (2010).
- W.S. Przybysz, J. Ellis, S. Chakraborty Thakur, A. Hansen, R.A. Hardin, S. Sears, E.E. Scime, "A magneto-optic probe for magnetic fluctuation measurements", *Review of Scientific Instruments* **80**, 103502 (2009).
- S. Chakraborty Thakur, Z. Harvey, I.A. Biloiu, A. Hansen, R.A. Hardin, W.S. Przybysz, E.E. Scime, "Increased Upstream Ionization due to Formation of a Double Layer", *Physical Review Letters* **102**, 035004 (2009).
- Z. Harvey, S. Chakraborty Thakur, A. Hansen, R. Hardin, W.S. Przybysz, and E.E. Scime, "Comparison of gridded energy analyzer and laser induced fluorescence measurements of a two-component ion distribution", *Review of Scientific Instruments* **79**, 10F314 (2008).
- D.T. Garnier, A. Hansen, M.E. Mauel, E. Ortiz, A. Boxer, J. Ellsworth, I. Karim, J. Kesner, S. Mahar, A. Roach, "Production and Study of High-Beta Plasma Confined by a Superconducting Dipole Magnet", *Physics of Plasmas* **13**, 056111 (2006).
- J. Kesner, D.T. Garnier, A. Hansen, M. Mauel, L. Bromberg, "Helium catalysed D-D fusion in a levitated dipole", *Nuclear Fusion* **44**, 193 (2004).
- B.E. Chapman, A.F. Almagri, J.K. Anderson, T.M. Biewer, P.K. Chattopadhyay, C.-S. Chiang, D. Craig, D.J. Den Hartog, G. Fiksel, C.B. Forest, A.K. Hansen, D. Holly, N.E. Lanier, R. O'Connell, S.C. Prager, J.C. Reardon, J.S. Sarff, M.D. Wyman, D.L. Brower, W.X. Ding, Y. Jiang, S.D. Terry, P. Franz, L. Marrelli, P. Martin, "High confinement plasmas in the Madison Symmetric Torus reversed-field pinch", *Physics of Plasmas* **9**, 2061 (2002).
- B.E. Chapman, J.K. Anderson, T.M. Biewer, D.L. Brower, S. Castillo, P.K. Chattopadhyay, C.-S. Chiang, D. Craig, D.J. Den-Hartog, G. Fiksel, P.W. Fontana, C.B. Forest, S. Gerhardt, A.K. Hansen, D. Holly, Y. Jiang, N.E. Lanier, S.C. Prager, J.C. Reardon, J.S. Sarff, "Reduced edge instability and improved confinement in the MST reversed-field pinch", *Physical Review Letters* **87**, 200501 (2001).
- J.S. Sarff, A.F. Almagri, J.K. Anderson, B.E. Chapman, D. Craig, C-S. Chiang, N.A. Crocker, D.J. Den Hartog, G. Fiksel, A.K. Hansen, S.C. Prager, "Plasma flow in MST: effects of edge biasing and momentum transport from nonlinear magnetic torques", *Inst. Phys. Czechoslovak Journal of Physics (3rd Europhysics Workshop, "Role of Electric Fields in Plasma Confinement and Exhaust", Budapest, Hungary, 18-19 June 2000)* **50** (12), Acad. Sci. Czech Republic, 1471 (2000).
- **Conference Proceedings**
- --As Primary Author--
- A.K. Hansen, I.A. Biloiu, A. Meige, E.E. Scime, "Particle in Cell Simulations of Double Layers in Xe-Ar Helicon Plasmas", *Bulletin of the American Physical Society* **55** (15), (2010).
- Alexander Hansen, I.A. Biloiu, E.E. Scime, A. Meige, "Comparison of Particle in Cell Simulations of Double Layers in a Xe-Ar Helicon Plasma with Experimental Results", *Bulletin of the American Physical Society* **54** (15), 129 (2009).
- Alex Hansen, Saeid Houshmandyar, Earl Scime, "Pulsed Alfvén Wave Experiments in a Helicon Plasma Source", *Bulletin of the American Physical Society* **53** (14), 102 (2008).
- Alex Hansen, Saeid Houshmandyar, Earl Scime, "Pulsed Alfvén Wave Experiments in a Helicon Plasma Source", *Bulletin of the American Physical Society* **52** (16), 201 (2007).

- A.K. Hansen, D.T. Garnier, M.E. Mauel, E.E. Ortiz, J. Kesner, A.C. Boxer, J.L. Ellsworth, I. Karim, S. Mahar, "Effect of Electron Cyclotron Resonance Heating Location upon Confinement in a Laboratory Dipole Plasma ", *Bulletin of the American Physical Society* **50** (8), 34 (2005).
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- A.K. Hansen, D.T. Garnier, M.E. Mauel, E. E. Ortiz, J. Kesner, A.C. Boxer, S. Dagen, J.L. Ellsworth, O. Grulke, I. Karim, S. Mahar, A. Roach, "Plan for first plasmas in LDX", *Bulletin of the American Physical Society* **48** (7), 61 (2003).
- A.K. Hansen, D.T. Garnier, M.E. Mauel, E.E. Ortiz, S.M. Dagen, I. Karim, J. Kesner, "Plans for initial operation of the Levitated Dipole Experiment", *Bulletin of the American Physical Society* **47** (9), 213 (2002).
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- A. K. Hansen, D. J. Den Hartog, C. C. Hegna, S. C. Prager, J. S. Sarff, "Nonlinear Coupling Between Edge- and Core-Resonant Modes May Cause Locking in the Reversed-Field Pinch ", *Bulletin of the American Physical Society* **43** (8), 1714 (1998).
- A.K. Hansen, J. T. Chapman, D. J. Den Hartog, C. C. Hegna, E. Martinez, S. C. Prager, J. S. Sarff, "Sudden Changes in Flow not Related to Field Errors ", *Bulletin of the American Physical Society* **42** (10), 2045 (1997).
- A. K. Hansen, A. F. Almagri, P. Campostrini, D. J. Den Hartog, T. Lovell, S. C. Prager, J. S. Sarff, G. Zollino, "Effect of Applying a Localized Field Error on the MST Reversed-Field Pinch", *Bulletin of the American Physical Society* **41** (7), 1408 (1996).
- A. K. Hansen, J. T. Chapman, D. J. Den Hartog, N. Lanier, J. S. Sarff, M. Stoneking, "Near Infrared Spectrometer Measurements on the MST Reversed-Field Pinch", *Bulletin of the American Physical Society* **40** (9), 228 (1995).
- --As Coauthor--
- J. Elfritz, A.K. Hansen, M. Galante, S. Houshmandyar, S. Sears, E.E. Scime, "Hybrid Modeling of Alfvén Wave Propagation in a Helicon Plasma Source", *Bulletin of the American Physical Society* **55** (15), (2010).
- Matthew Galante, Alexander Hansen, Dustin McCarren, Stephanie Sears, Saeid Houshmandyar, Earl Scime, "Simultaneous two-dimensional laser induced fluorescence measurements in a helicon plasma", *Bulletin of the American Physical Society* **55** (15), (2010).
- Jerry Carr, Saikat Chakraborty Thakur, Alex Hansen, Dustin McCarren, Earl Scime, West Virginia University Plasma Physics Team, "Studies of Electrostatic Instabilities During Double Layer Formation Using Time-Resolved LIF", *Bulletin of the American Physical Society* **55** (15), (2010).
- Dustin McCarren, Saikat Chakraborty Thakur, Jerry Carr Jr., Matthew Galante, Alex Hansen, "A comparison of laser induced fluorescence and continuous wave ring down spectroscopy IVDF measurements in an argon helicon plasma", *Bulletin of the American Physical Society* **55** (15), (2010).
- Saikat Chakraborty Thakur, Dustin McCarren, Jerry Carr Jr., Matthew Galante, Alex Hansen, Helicon Source Group Team, "Continuous wave cavity ring down spectroscopy measurements of ion velocity distribution functions in argon helicon plasma", *Bulletin of the American Physical Society* **55** (15), (2010).
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- William Przybysz, J. Ellis, A. Hansen, R.A. Hardin, E.E. Scime, "Construction of an All-Optical B-Dot Probe", *Bulletin of the American Physical Society* **53** (14), 130 (2008).
- Saikat Chakraborty Thakur, Zane Harvey, Ioana Biloiu, Alex Hansen, Robert Hardin, William Przybysz, Earl Scime, "Frequency threshold for ion beam formation in expanding RF plasma", *Bulletin of the American Physical Society* **53** (14), 173 (2008).
- Daniel Lewis, Alexander Hansen, Earl Scime, "Ion Velocity Distribution Functions in a Compact, Expanding, Helicon Plasma", *Bulletin of the American Physical Society* **52** (16), 72 (2007).
- Robert Hardin, Earl Scime, Alex Hansen, "Slow wave measurement using the WVU 300 GHz collective scattering diagnostic", *Bulletin of the American Physical Society* **52** (16), 137 (2007).
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- A.K. Hansen, J. Kesner, M.E. Mauel, P.C. Michael, J.V. Minervini, A. Radovinsky, A. Zhukovsky, A. Boxer, J.L. Ellsworth, I. Karim, E.E. Ortiz, "Design and initial operation of LDX facility", *Fusion Engineering and Design (Proceedings of 15th International Toki Conference, "Fusion & Advanced Technology")* **81**, (2006).
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- D.T. Garnier, A.K. Hansen, M.E. Mauel, E.E. Ortiz, A.C. Boxer, J.L. Ellsworth, I. Karim, J. Kesner, P.C. Michael, A. Zhukovsky, "Campaign for Levitation in LDX", *Bulletin of the American Physical Society* **51** (7), 302 (2006).
- J.L. Ellsworth, A.C. Boxer, I. Karim, J. Kesner, D.T. Garnier, A.K. Hansen, M.E. Mauel, E.E. Ortiz, "Visible and x-ray imaging of a laboratory dipole", *Bulletin of the American Physical Society* **51** (7), 303 (2006).
- E.E. Ortiz, M.E. Mauel, D.T. Garnier, A.K. Hansen, J. Kesner, A. Boxer, J.L. Ellsworth, I. Karim, R. Bergmann, "High Beta Observations of the Hot Electron Interchange Instability", *Bulletin of the American Physical Society* **51** (7), 303 (2006).
- D.T. Garnier, A.K. Hansen, E.E. Ortiz, M.E. Mauel, A. Boxer, J.L. Ellsworth, I. Karim, J. Kesner, S. Mahar, E. Mimoun, A. Zhukovsky, "Production and Study of High-Beta Plasma in LDX", *Bulletin of the American Physical Society* **50** (8), 34 (2005).
- J.L. Ellsworth, J. Kesner, D.T. Garnier, A.K. Hansen, M.E. Mauel, "X-ray Measurements of the Levitated Dipole", *Bulletin of the American Physical Society* **50** (8), 34 (2005).
- Ishtak Karim, Jay Kesner, Darren Garnier, Alexander Hansen, Mike Mauel, "Measurement of Equilibrium Current Profiles in LDX", *Bulletin of the American Physical Society* **50** (8), 35 (2005).
- A.C. Boxer, J. Kesner, M.E. Mauel, D.T. Garnier, A.K. Hansen, "Microwave Interferometer for the Levitated Dipole Experiment", *Bulletin of the American Physical Society*, 35 (2005).
- E.E. Ortiz, M.E. Mauel, D.T. Garnier, A.K. Hansen, J. Kesner, J.L. Ellsworth, I. Karim, "Probe Measurements of Electrostatic Fluctuations in LDX", *Bulletin of the American Physical Society* **50** (8), 35 (2005).
- D.T. Garnier, A.K. Hansen, M.E. Mauel, E.E. Ortiz, J.L. Ellsworth, I. Karim, J. Kesner, "Levitated Dipole Experiment: Overview of First Results and Plans", *Bulletin of the American Physical Society* **49** (7), 49 (2004).
- J. Kesner, D.T. Garnier, A.K. Hansen, M.E. Mauel, "X-Ray Measurements of the Levitated Dipole Experiment", *Bulletin of the American Physical Society* **49** (7), 50 (2004).
- Scott Mahar, Jay Kesner, Darren Garnier, Alexander Hansen, Mike Mauel, "Multiple Frequency Electron Cyclotron Resonance Heating on the Levitated Dipole Experiment", *Bulletin of the American Physical Society* **49** (7), 50 (2004).
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- E.E. Ortiz, M.E. Mauel, D.T. Garnier, A.K. Hansen, B.J. Levitt, J. Kesner, A. Boxer, J.L. Ellsworth, I. Karim, "Probe Measurements of Electrostatic Fluctuations in LDX", *Bulletin of the American Physical Society* **49** (7), 50 (2004).
- J. Kesner, M.E. Mauel, D.T. Garnier, A.K. Hansen, "Microwave Interferometer for the Levitated Dipole Experiment", *Bulletin of the American Physical Society* **49** (7), 50 (2004).
- J.L. Ellsworth, J. Kesner, D.T. Garnier, A.K. Hansen, M.E. Mauel, S. Zweben, "X-Ray Diagnostics for the Levitated Dipole Experiment", *Bulletin of the American Physical Society* **48** (7), 61 (2003).
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