Jeremy M. Hanson, Ph. D.

jmh2130@columbia.edu
http://www.columbia.edu/~jmh2130 https://www.linkedin.com/in/hansonjm

Education

Ph. D. Applied Physics, May 2009.
Columbia University (New York, NY)
Advisor: Professor Gerald A. Navratil
Dissertation: *A Kalman Filter for Active Feedback on Rotating External Kink Instabilities in a Tokamak Plasma*

M. S. Applied Physics, May 2005.
Columbia University (New York, NY)

B. S. Applied Mathematics, Engineering, and Physics, May 2004.
University of Wisconsin-Madison (Madison, WI)

Experience

Department of Applied Physics & Applied Mathematics - Columbia University
Associate Research Scientist, DIII-D National Fusion Facility, May 2011 – present.

- Published research results in peer-reviewed journal articles.
- Oral presentations at national and international conferences.
- Led collaborative planning and execution of scientific experiments.
- Mentored undergraduate, graduate, and postdoctoral researchers.
- Coauthored successful research grant applications.
- Proficiency with plasma equilibrium, transport, and MHD stability codes.
- DIII-D Chief Run Coordinator, Oct 2025 – present.
- Leader, "ITER Integrated Scenarios" topical area, Dec 2023 – Dec 2025.
- DIII-D run schedule coordination team, Jan 2019 – present.
- Deputy Leader, "3D & Stability Physics" topical area, Jan 2015 – Aug 2023.
- DIII-D physics operator, Apr 2014 – Mar 2022.
- Deputy Leader, "Stability and Disruption Avoidance" topical area, Dec 2012 – Dec 2014.
- DIII-D Research Council member, Jan 2012 – Jul 2013.

Postdoctoral Fellow, DIII-D National Fusion Facility, May 2009 – May 2011.

- Designed and implemented real-time control algorithms in DIII-D plasma control system.
- Simulated eigenvalue and time-domain stability and control problems.
- Jointly affiliated with Oak Ridge Institute for Science and Education.

Research Assistant, High Beta Tokamak-Extended Pulse experiment, Jun 2005 – May 2009.

- Created tokamak plasmas.
- Designed and implemented real-time Kalman filter algorithm for control of plasma instabilities.
- Maintained experimental systems: CAMAC and D-TACQ digitizers, magnet cooling system, power supplies, capacitor banks.
- Administered Linux and VMS data-acquisition and analysis servers.

Teaching Assistant, Computational Mathematics and Physics, Jan 2005 – May 2005.
Teaching Assistant, Applied Linear Algebra, Sep 2004 – Dec 2004.

- Assisted students in understanding course material.
- Proctored written examinations.
- Generated solution sets for weekly assignments.
- Corrected assignments and exams; tabulated grades.

UW-Madison Plasma Physics Group
Lab Assistant, Jan 2001 – Aug 2004.

Computer skills

Adobe Illustrator, Bash, C, Git, HTML/CSS, IDL, LaTeX, Matlab, MDSplus, Microsoft Office, LabVIEW, Linux, Python, VMS.

Plasma equilibrium reconstruction, transport, and stability analysis codes.

Professional development

Certificate, Leadership and Management Program, May 2015.
University of California, San Diego Extension (San Diego, CA)

Professional activities

Program committee member, APS Division of Plasma Physics meeting, 2026.

Expert group member, Transients Expert Group, APS Division of Plasma Physics Community Planning Process, 2019.

Guest editor, *Plasma Physics and Controlled Fusion* **60**, special issue for 22$^{\text{nd}}$ Workshop on MHD Stability Control, 2018.

Breakout group co-leader, US Magnetic Fusion Research Strategic Directions Workshop 2, Austin, TX, 2017.

Program chair, 22$^{\text{nd}}$ Workshop on MHD Stability Control, Madison, WI, 2017.

Panel member, DOE Fusion Energy Sciences workshop on Transients in Tokamak Plasmas, 2015.

Peer reviewer, *Fusion Engineering and Design, Fusion Science and Technology, Journal of Fusion Energy, Journal of Plasma Physics, Nuclear Fusion, Physics of Plasmas, Plasma Physics and Controlled Fusion, Plasma Science and Technology*, 2011 – present.

Member, American Physical Society, 2005 – present.

Presentations

"Non-ideal stability and control of ITER baseline demonstration discharges," Invited talk at the 62$^{\text{nd}}$ annual meeting of the APS Division of Plasma Physics (virtual), Nov 12, 2020.

"Perturbative response measurements for MHD stability understanding and control," Invited talk at the 24$^{\text{th}}$ Workshop on MHD Stability Control at Columbia University in New York, NY, Oct 29, 2019.

"Feedback-Assisted Extension of the Tokamak Operating Space to Low Safety Factor," Invited talk at the 55$^{\text{th}}$ annual meeting of the APS Division of Plasma Physics in Denver, CO, Nov 14, 2013.

"Understanding and controlling resistive wall mode stability on DIII-D," University of Wisconsin-Madison Plasma Physics Seminar, Apr 22, 2013.

"Understanding and controlling resistive wall mode stability on DIII-D," Auburn University Physics Colloquium, Nov 15, 2012.

"Uncovering RWM Stability Limits in Tokamaks," Invited talk at the 16$^{\text{th}}$ Workshop on MHD Stability Control at General Atomics, San Diego, CA, Nov 21, 2011.

"Feedback Control of Rotating External Kink Modes using a Kalman Filter," University of Wisconsin-Madison Plasma Physics Seminar, Jan 26, 2009.

"Feedback Suppression of Rotating External Kink Modes in the Presence of Noise," Invited talk at the 50$^{\text{th}}$ annual meeting of the APS Division of Plasma Physics in Dallas, TX, Nov 17, 2008.

Honors

Robert Simon Memorial Prize, May 2010.
Awarded annually by the Department of Applied Physics and Applied Mathematics to the graduate student who has completed the most outstanding dissertation.
(APAM Department, Columbia University)

U.S. Department of Energy Fusion Energy Sciences Postdoctoral Research Program appointment, May 2009.
The Fusion Energy Postdoctoral Research Program offers recent doctoral degree recipients the opportunity to conduct research in the U.S. Department of Energy's fusion energy research and development programs.
(Office of Fusion Energy Sciences, U.S. Department of Energy)

Extraordinary Teaching Assistant Award, December 2005.
Awarded for exceptional effort as a teaching assistant and excellence in undergraduate education.
(School of Engineering and Applied Science, Columbia University)

AMEP Leadership Prize, May 2004.
Awarded yearly to outstanding students pursuing a degree in Applied Mathematics, Engineering, and Physics (AMEP). (University of Wisconsin–Madison)

Publications

Citation count: 3006 (Google Scholar, Jun 2026).
H-index: 30 (Google Scholar, Jun 2026).

Lead-author publications

J. M. Hanson, M. Clement, A. M. Garofalo, and E. J. Strait, "Variable-spectrum mode control of high poloidal beta discharges," *Nuclear Fusion* **64**, 086024 (2024).

J. M. Hanson, F. Turco, T. C. Luce, G. A. Navratil, and E. J. Strait, "Resistive contributions to the stability of DIII-D ITER baseline demonstration discharges," *Physics of Plasmas* **28**, 042502 (2021).

J. M. Hanson, J. W. Berkery, J. Bialek, M. Clement, J. R. Ferron, A. M. Garofalo, C. T. Holcomb, R. J. La Haye, M. J. Lanctot, T. C. Luce, G. A. Navratil, K. E. J. Olofsson, E. J. Strait, F. Turco, and A. D. Turnbull, "Stability of DIII-D high-performance, negative central shear discharges," *Nuclear Fusion* **57**, 056009 (2017).

J. M. Hanson, J. Bialek, F. Turco, J. King, G. A. Navratil, E. J. Strait, and A. Turnbull, "Validation of conducting wall models using magnetic measurements," *Nuclear Fusion* **56**, 106022 (2016).

J. M. Hanson, J. M. Bialek, M. Baruzzo, T. Bolzonella, A. W. Hyatt, G. L. Jackson, J. King, R. J. La Haye, M. J. Lanctot, L. Marrelli, P. Martin, G. A. Navratil, M. Okabayashi, K. E. J. Olofsson, C. Paz-Soldan, P. Piovesan, C. Piron, L. Piron, D. Shiraki, E. J. Strait, D. Terranova, F. Turco, A. D. Turnbull, and P. Zanca, "Feedback-assisted extension of the tokamak operating space to low safety factor," *Physics of Plasmas* **21**, 072107 (2014).

J. M. Hanson, H. Reimerdes, M. J. Lanctot, Y. In, R. J. La Haye, G. L. Jackson, G. A. Navratil, M. Okabayashi, P. E. Sieck, and E. J. Strait, "Feedback control of the proximity to marginal RWM stability using active MHD spectroscopy," *Nucl. Fusion* **52**, 013003 (2012).

J. M. Hanson, B. De Bono, J. P. Levesque, M. E. Mauel, D. A. Maurer, G. A. Navratil, T. Sunn Pedersen, D. Shiraki, and R. W. James, "A Kalman filter for feedback control of rotating external kink instabilities in the presence of noise," *Physics of Plasmas* **16**, 056112 (2009).

J. M. Hanson, A. J. Klein, M. E. Mauel, D. A. Maurer, G. A. Navratil, and T. Sunn Pedersen, "A digital control system for external magnetohydrodynamic modes in tokamak plasmas," *Review of Scientific Instruments* **80**, 043503 (2009).

J. M. Hanson, B. De Bono, R. W. James, J. P. Levesque, M. E. Mauel, D. A. Maurer, G. A. Navratil, T. S. Pedersen, and D. Shiraki, "Feedback suppression of rotating external kink instabilities in the presence of noise," *Physics of Plasmas* **15**, 080704 (2008).

Additional publications

Y. Jiang, E. J. Strait, Q. Hu, N. C. Logan, S. Yang, C. Chrystal, D. Shiraki, J. Hanson, S. Shi, D. Orlov, and W. Choi, "Error field measurements with rotating RMP fields for DIII-D H-mode," *Nuclear Fusion* **66**, 016046 (2026).

J. Yang, N. C. Logan, J. Berkery, W. Boyes, D. P. Brennan, R. Chandra, H. J. Farre-Kaga, J. Hanson, E. C. Howell, E. Kostadinova, J. Levesque, S. Van Mulders, A. Reiman, A. Rothstein, S. Sabbagh, and F. Turco, "Technology readiness assessment of magnetohydrodynamic stability control," *Plasma Physics and Controlled Fusion* **67**, 095015 (2025).

E. J. Strait, Y. Z. Jiang, Q. Hu, J. M. Hanson, N. C. Logan, and C. Paz-Soldan, "Error field identification through torque balance on a saturated island in DIII-D," *Plasma Physics and Controlled Fusion* **67**, 075028 (2025).

S. Ding, A. M. Garofalo, H. Q. Wang, W. Choi, X. Z. Gong, J. P. Qian, J. Huang, D. Hatch, M. T. Kotschenreuther, S. Mahajan, D. B. Weisberg, Z. Y. Li, Z. Yan, X. Jian, S. G. Baek, P. Bonoli, G. Wallace, D. Eldon, B. S. Victor, A. Marinoni, Q. M. Hu, I. S. Carvalho, T. Odstrčil, L. Wang, K. D. Li, A. W. Hyatt, T. H. Osborne, J. McClenaghan, C. T. Holcomb, J. M. Hanson, Y. X. Sun, and Z. H. Wang, "Turbulence suppression at extreme plasma densities on DIII-D and EAST," *Physics of Plasmas* **32**, 022502 (2025).

Q. Hu, N. Logan, C. Paz-Soldan, J. Barr, S. Kim, J. Hanson, Y. Jiang, S. Yang, A. Bortolon, W. Choi, Y. Liu, J. K. Park, E. Strait, and Q. Yu, "Non-disruptive error field measurement in DIII-D low safety factor plasmas and projection to ITER," *Nuclear Fusion* **65**, 016006 (2024).

W. Boyes, F. Turco, J. Hanson, G. Navratil, A. Turnbull, A. Hyatt, T. Luce, W. Meyer, A. Nelson, T. Odstrcil, T. Osborne, F. Scotti, A. Welander, and A. Wingen, "Novel intrinsic helical cores and MHD dynamo flux pumping evidence in DIII-D," *Nuclear Fusion* **64**, 124005 (2024).

C. Holcomb for the DIII-D Team:, *et al.*, "DIII-D research to provide solutions for ITER and fusion energy," *Nuclear Fusion* **64**, 112003 (2024).

F. Turco, T. C. Luce, T. Osborne, T. Odstrcil, J. M. Hanson, A. McLean, and A. Hyatt, "Radiation induced non-linear oscillations in ITER baseline scenario plasmas in DIII-D," *Nuclear Fusion* **64**, 086008 (2024).

F. Turco, T. Luce, W. Boyes, J. Hanson, and A. Hyatt, "Modelling and experiment to stabilize disruptive tearing modes in the ITER baseline scenario in DIII-D," *Nuclear Fusion* **64**, 076048 (2024).

F. Turco, T. Luce, A. Sips, C. Greenfield, T. Osborne, T. Odstrcil, J. Hanson, A. McLean, and A. Hyatt, "First tungsten radiation studies in DIII-D's ITER baseline demonstration discharges," *Nuclear Fusion* **64**, 076063 (2024).

S. Ding, A. M. Garofalo, H. Q. Wang, D. B. Weisberg, Z. Y. Li, X. Jian, D. Eldon, B. S. Victor, A. Marinoni, Q. M. Hu, I. S. Carvalho, T. Odstrčil, L. Wang, A. W. Hyatt, T. H. Osborne, X. Z. Gong, J. P. Qian, J. Huang, J. McClenaghan, C. T. Holcomb, and J. M. Hanson, "A high-density and high-confinement tokamak plasma regime for fusion energy," *Nature* **629**, 555 (2024).

B. C. Lyons, J. McClenaghan, T. Slendebroek, O. Meneghini, T. F. Neiser, S. P. Smith, D. B. Weisberg, E. A. Belli, J. Candy, J. M. Hanson, L. L. Lao, N. C. Logan, S. Saarelma, O. Sauter, P. B. Snyder, G. M. Staebler, K. E. Thome, and A. D. Turnbull, "Flexible, integrated modeling of tokamak stability, transport, equilibrium, and pedestal physics," *Physics of Plasmas* **30**, 092510 (2023).

W. Boyes, F. Turco, J. Hanson, A. Marinoni, A. Turnbull, M. Austin, and G. Navratil, "MHD stability of negative triangularity DIII-D plasmas," *Nuclear Fusion* **63**, 086007 (2023).

A. F. Battey, J. M. Hanson, J. Bialek, F. Turco, G. A. Navratil, and N. C. Logan, "Simultaneous stabilization and control of the $n = 1$ and $n = 2$ resistive wall mode," *Nuclear Fusion* **63**, 066025 (2023).

K. R. Gage, X. Chen, M. Van Zeeland, W. W. Heidbrink, J. Hanson, B. Lyons, D. C. Pace, J. Galdon-Quiroga, and M. Garcia-Munoz, "Impact of β_n and spectrum of $n = 1$ applied fields on fast ion losses in DIII-D," *Nuclear Fusion* **63**, 036002 (2023).

M. E. Fenstermacher, *et al.*, "DIII-D research advancing the physics basis for optimizing the tokamak approach to fusion energy," *Nuclear Fusion* **62**, 042024 (2022).

L. Wang, H. Wang, D. Eldon, Q. Yuan, S. Ding, K. Li, A. Garofalo, X. Gong, G. Xu, H. Guo, K. Wu, L. Meng, J. Xu, J. Liu, M. Chen, B. Zhang, Y. Duan, F. Ding, Z. Yang, J. Qian, J. Huang, Q. Ren, A. Leonard, M. Fenstermacher, C. Lasnier, J. Watkins, M. Shafer, J. Barr, D. Weisberg, J. McClenaghan, J. Hanson, A. Hyatt, T. Osborne, D. Thomas, D. Humphreys, R. Buttery, G. N. Luo, B. Xiao, B. Wan, and J. Li, "Achievements of actively controlled divertor detachment compatible with sustained high confinement core in DIII-D and EAST," *Nuclear Fusion* **62**, 076002 (2022).

A. Marinoni, M. Austin, A. Hyatt, S. Saarelma, F. Scotti, Z. Yan, C. Chrystal, S. Coda, F. Glass, J. Hanson, A. McLean, D. Pace, C. Paz-Soldan, C. Petty, M. Porkolab, L. Schmitz, F. Sciortino, S. Smith, K. Thome, F. Turco, and the DIII-D Team, "Diverted negative triangularity plasmas on DIII-D: the benefit of high confinement without the liability of an edge pedestal," *Nuclear Fusion* **61**, 116010 (2021).

M. Knolker, T. E. Evans, P. B. Snyder, B. Grierson, J. Hanson, A. Jaervinen, X. Jian, J. McClenaghan, T. Osborne, C. Paz-Soldan, W. Solomon, and T. Wilks, "On the stability and stationarity of the Super H-mode combined with an ion transport barrier in the core," *Plasma Physics and Controlled Fusion* **63**, 025017 (2021).

M. Okabayashi, S. Inoue, N. Logan, N. Taylor, E. Strait, J. de Grassie, N. Ferraro, J. Hanson, S. Jardin, R. L. Haye, Y. Liu, C. Paz-Soldan, L. Sugiyama, and A. Wingen, "A new stabilizing regime of tearing mode entrainment in the presence of a static error field," *Nuclear Fusion* **59**, 126015 (2019).

E. J. Strait, J. L. Barr, M. Baruzzo, J. W. Berkery, R. J. Buttery, P. C. de Vries, N. W. Eidietis, R. S. Granetz, J. M. Hanson, C. T. Holcomb, D. A. Humphreys, J. H. Kim, E. Kolemen, M. Kong, M. J. Lanctot, M. Lehnen, E. Lerche, N. C. Logan, M. Maraschek, M. Okabayashi, J. K. Park, A. Pau, G. Pautasso, F. M. Poli, C. Rea, S. A. Sabbagh, O. Sauter, E. Schuster, U. A. Sheikh, C. Sozzi, F. Turco, A. D. Turnbull, Z. R. Wang, W. P. Wehner, and L. Zeng, "Progress in disruption prevention for ITER," *Nuclear Fusion* **59**, 112012 (2019).

V. Igochine, A. Gude, S. Günter, J. M. Hanson, K. Lackner, C. Paz-Soldan, E. Strait, H. Zohm, the ASDEX Upgrade Team, and the DIII-D team, "Seeding of neoclassical tearing modes by internal crash events in the ASDEX Upgrade and DIII-D tokamaks," *Nuclear Fusion* **59**, 066038 (2019).

Z. R. Wang, N. C. Logan, S. Munaretto, Y. Q. Liu, Y. W. Sun, S. Gu, J. K. Park, J. M. Hanson, Q. M. Hu, T. Strait, R. Nazikian, E. Kolemen, and J. E. Menard, "Identification of multiple eigenmode growth rates in DIII-D and EAST tokamak plasmas," *Nuclear Fusion* **59**, 024001 (2019).

F. Turco, T. C. Luce, W. Solomon, G. Jackson, G. A. Navratil, and J. M. Hanson, "The causes of the disruptive tearing instabilities of the ITER Baseline Scenario in DIII-D," *Nuclear Fusion* **58**, 106043 (2018).

C. Rea, R. S. Granetz, K. Montes, R. A. Tinguely, N. Eidietis, J. M. Hanson, and B. Sammuli, "Disruption prediction investigations using Machine Learning tools on DIII-D and Alcator C-Mod," *Plasma Physics and Controlled Fusion* **60**, 084004 (2018).

M. Clement, J. Hanson, J. Bialek, and G. Navratil, "$\mathscr{H}_2$ optimal control techniques for resistive wall mode feedback in tokamaks," *Nuclear Fusion* **58**, 046017 (2018).

A. M. Garofalo, X. Z. Gong, S. Y. Ding, J. Huang, J. McClenaghan, C. K. Pan, J. Qian, Q. L. Ren, G. M. Staebler, J. Chen, L. Cui, B. A. Grierson, J. M. Hanson, C. T. Holcomb, X. Jian, G. Li, M. Li, A. Y. Pankin, Y. Peysson, X. Zhai, P. Bonoli, D. Brower, W. X. Ding, J. R. Ferron, W. Guo, L. L. Lao, K. Li, H. Liu, B. Lyv, G. Xu, and Q. Zang, "Joint DIII-D/EAST research on the development of a high poloidal beta scenario for the steady state missions of ITER and CFETR," *Plasma Physics and Controlled Fusion* **60**, 014043 (2018).

R. A. Moyer, C. Paz-Soldan, R. Nazikian, D. M. Orlov, N. M. Ferraro, B. A. Grierson, M. Knölker, B. C. Lyons, G. R. McKee, T. H. Osborne, T. L. Rhodes, O. Meneghini, S. Smith, T. E. Evans, M. E. Fenstermacher, R. J. Groebner, J. M. Hanson, R. J. La Haye, T. C. Luce, S. Mordijck, W. M. Solomon, F. Turco, Z. Yan, and L. Zeng, "Validation of the model for ELM suppression with 3D magnetic fields using low torque ITER baseline scenario discharges in DIII-D," *Physics of Plasmas* **24**, 102501 (2017).

M. Clement, J. Hanson, J. Bialek, and G. Navratil, "GPU-based optimal control for RWM feedback in tokamaks," *Control Engineering Practice* **68**, 15 (2017).

M. J. Lanctot, J. K. Park, P. Piovesan, Y. Sun, R. J. Buttery, L. Frassinetti, B. A. Grierson, J. M. Hanson, S. R. Haskey, Y. In, Y. M. Jeon, R. J. La Haye, N. C. Logan, L. Marrelli, D. M. Orlov, C. Paz-Soldan, H. H. Wang, and E. J. Strait, "Impact of toroidal and poloidal mode spectra on the control of non-axisymmetric fields in tokamaks," *Physics of Plasmas* **24**, 056117 (2017).

M. J. Lanctot, J. A. Snipes, H. Reimerdes, C. Paz-Soldan, N. Logan, J. M. Hanson, R. J. Buttery, J. S. deGrassie, A. M. Garofalo, T. K. Gray, B. A. Grierson, J. D. King, G. J. Kramer, R. J. La Haye, D. C. Pace, J. K. Park, A. Salmi, D. Shiraki, E. J. Strait, W. M. Solomon, T. Tala, and M. A. Van Zeeland, "A path to stable low-torque plasma operation in ITER with test blanket modules," *Nuclear Fusion* **57**, 036004 (2017).

M. Okabayashi, P. Zanca, E. J. Strait, A. M. Garofalo, J. M. Hanson, Y. In, R. J. La Haye, L. Marrelli, P. Martin, R. Paccagnella, C. Paz-Soldan, P. Piovesan, C. Piron, L. Piron, D. Shiraki, F. A. Volpe, and The DIII-D and RFX-mod Teams, "Avoidance of tearing mode locking with electro-magnetic torque introduced by feedback-based mode rotation control in DIII-D and RFX-mod," *Nuclear Fusion* **57**, 016035 (2017).

A. Wingen, R. S. Wilcox, M. R. Cianciosa, S. K. Seal, E. A. Unterberg, J. M. Hanson, S. P. Hirshman, L. L. Lao, N. C. Logan, C. Paz-Soldan, and M. W. Shafer, "Use of reconstructed 3D VMEC equilibria to match effects of toroidally rotating discharges in DIII-D," *Nuclear Fusion* **57**, 016013 (2017).

E. J. Strait, J. D. King, J. M. Hanson, and N. C. Logan, "Spatial and temporal analysis of DIII-D 3D magnetic diagnostic data," *Review of Scientific Instruments* **87**, 11D423 (2016).

M. J. Lanctot, K. E. J. Olofsson, M. Capella, D. A. Humphreys, N. Eidietis, J. M. Hanson, C. Paz-Soldan, E. J. Strait, and M. L. Walker, "Error field optimization in DIII-D using extremum seeking control," *Nuclear Fusion* **56**, 076003 (2016).

A. D. Turnbull, J. M. Hanson, F. Turco, N. M. Ferraro, M. J. Lanctot, L. L. Lao, E. J. Strait, P. Piovesan, and P. Martin, "The external kink mode in diverted tokamaks," *Journal of Plasma Physics* **82**, 515820301 (2016).

J. D. King, E. J. Strait, N. M. Ferraro, J. M. Hanson, S. R. Haskey, M. J. Lanctot, Y. Q. Liu, N. Logan, C. Paz-Soldan, D. Shiraki, and A. D. Turnbull, "Landau resonant modification of multiple kink mode contributions to 3D tokamak equilibria," *Nuclear Fusion* **56**, 014003 (2016).

J. D. King, E. J. Strait, S. A. Lazerson, N. M. Ferraro, N. C. Logan, S. R. Haskey, J. K. Park, J. M. Hanson, M. J. Lanctot, Y. Liu, R. Nazikian, M. Okabayashi, C. Paz-Soldan, D. Shiraki, and A. D. Turnbull, "Experimental tests of linear and nonlinear three-dimensional equilibrium models in DIII-D," *Physics of Plasmas* **22**, 072501 (2015).

A. M. Garofalo, X. Gong, B. A. Grierson, Q. Ren, W. M. Solomon, E. J. Strait, M. A. V. Zeeland, C. T. Holcomb, O. Meneghini, S. P. Smith, G. M. Staebler, B. Wan, R. Bravenec, R. V. Budny, S. Ding, J. M. Hanson, W. W. Heidbrink, L. L. Lao, G. Li, C. Pan, C. C. Petty, J. Qian, C. Paz-Soldan, and G. Xu, "Compatibility of internal transport barrier with steady-state operation in the high bootstrap fraction regime on DIII-D," *Nuclear Fusion* **55**, 123025 (2015).

J. D. King, E. J. Strait, R. Nazikian, C. Paz-Soldan, D. Eldon, M. E. Fenstermacher, N. M. Ferraro, J. M. Hanson, S. R. Haskey, R. J. La Haye, M. J. Lanctot, S. A. Lazerson, N. C. Logan, Y. Q. Liu, M. Okabayashi, J. K. Park, D. Shiraki, and A. D. Turnbull, "Three-dimensional equilibria and island energy transport due to resonant magnetic perturbation edge localized mode suppression on DIII-D," *Physics of Plasmas* **22**, 112502 (2015).

F. Turco, A. D. Turnbull, J. M. Hanson, and G. A. Navratil, "Modeling of fast neutral-beam-generated ion effects on MHD-spectroscopic observations of resistive wall mode stability in DIII-D plasmas," *Physics of Plasmas* **22**, 022503 (2015).

C. Paz-Soldan, R. Nazikian, S. R. Haskey, N. C. Logan, E. J. Strait, N. M. Ferraro, J. M. Hanson, J. D. King, M. J. Lanctot, R. A. Moyer, M. Okabayashi, J. K. Park, M. W. Shafer, and B. J. Tobias, "Observation of a Multimode Plasma Response and its Relationship to Density Pumpout and Edge-Localized Mode Suppression," *Phys. Rev. Lett.* **114**, 105001 (2015).

M. A. Van Zeeland, N. M. Ferraro, B. A. Grierson, W. W. Heidbrink, G. J. Kramer, C. J. Lasnier, D. C. Pace, S. L. Allen, X. Chen, T. E. Evans, M. G. M. noz, J. M. Hanson, M. J. Lanctot, L. L. Lao, W. H. Meyer, R. A. Moyer, R. Nazikian, D. M. Orlov, C. Paz-Soldan, and A. Wingen, "Fast ion transport during applied 3D magnetic perturbations on DIII-D," *Nuclear Fusion* **55**, 073028 (2015).

A. M. Garofalo, K. H. Burrell, D. Eldon, B. A. Grierson, J. M. Hanson, C. Holland, G. T. A. Huijsmans, F. Liu, A. Loarte, O. Meneghini, T. H. Osborne, C. Paz-Soldan, S. P. Smith, P. B. Snyder, W. M. Solomon, A. D. Turnbull, and L. Zeng, "The quiescent H-mode regime for high performance edge localized mode-stable operation in future burning plasmas," *Physics of Plasmas* **22**, 056116 (2015).

C. Paz-Soldan, N. C. Logan, M. J. Lanctot, J. M. Hanson, J. D. King, R. J. La Haye, R. Nazikian, J. K. Park, and E. J. Strait, "Decoupled recovery of energy and momentum with correction of $n = 2$ error fields," *Nuclear Fusion* **55**, 083012 (2015).

F. Turco, C. C. Petty, T. C. Luce, T. N. Carlstrom, M. A. Van Zeeland, W. Heidbrink, F. Carpanese, W. Solomon, C. T. Holcomb, and J. R. Ferron, "The high-β_N hybrid scenario for ITER and FNSF steady-state missions," *Physics of Plasmas* **22**, 056113 (2015).

D. Shiraki, C. Paz-Soldan, J. M. Hanson, R. J. La Haye, N. C. Logan, K. E. J. Olofsson, E. J. Strait, R. M. Sweeney, and F. A. Volpe, "Measurements of the toroidal torque balance of error field penetration locked modes," *Plasma Physics and Controlled Fusion* **57**, 025016 (2015).

X. Chen, W. W. Heidbrink, M. A. Van Zeeland, G. J. Kramer, D. C. Pace, C. C. Petty, M. E. Austin, R. K. Fisher, J. M. Hanson, R. Nazikian, and L. Zeng, "Using neutral beams as a light ion beam probe," *Review of Scientific Instruments* **85**, 11E701 (2014).

C. Paz-Soldan, R. J. Buttery, A. M. Garofalo, J. M. Hanson, R. J. L. Haye, M. J. Lanctot, J. K. Park, W. M. Solomon, and E. J. Strait, "The spectral basis of optimal error field correction on DIII-D," *Nuclear Fusion* **54**, 073013 (2014).

C. T. Holcomb, J. R. Ferron, T. C. Luce, T. W. Petrie, J. M. Park, F. Turco, M. A. V. Zeeland, M. Okabayashi, C. T. Lasnier, J. M. Hanson, P. A. Politzter, Y. In, A. W. Hyatt, R. J. La Haye, and M. J. Lanctot, "Steady state scenario development with elevated minimum safety factor on DIII-D," *Nuclear Fusion* **54**, 093009 (2014).

J. D. King, E. J. Strait, R. L. Boivin, D. Taussig, M. G. Watkins, J. M. Hanson, N. C. Logan, C. Paz-Soldan, D. C. Pace, D. Shiraki, M. J. Lanctot, R. J. La Haye, L. L. Lao, D. J. Battaglia, A. C. Sontag, S. R. Haskey, and J. G. Bak, "An upgrade of the magnetic diagnostic system of the DIII-D tokamak for non-axisymmetric measurements," *Review of Scientific Instruments* **85**, 083503 (2014).

P. Piovesan, J. M. Hanson, P. Martin, G. A. Navratil, F. Turco, J. Bialek, N. M. Ferraro, R. J. La Haye, M. J. Lanctot, M. Okabayashi, C. Paz-Soldan, E. J. Strait, A. D. Turnbull, P. Zanca, M. Baruzzo, T. Bolzonella, A. W. Hyatt, G. L. Jackson, L. Marrelli, L. Piron, and D. Shiraki, "Tokamak Operation with Safety Factor $q_{95} < 2$ via Control of MHD Stability," *Phys. Rev. Lett.* **113**, 045003 (2014).

K. E. J. Olofsson, J. M. Hanson, D. Shiraki, F. A. Volpe, D. A. Humphreys, R. J. La Haye, M. J. Lanctot, E. J. Strait, A. S. Welander, E. Kolemen, and M. Okabayashi, "Array magnetics modal analysis for the DIII-D tokamak based on localized time-series modelling," *Plasma Physics and Controlled Fusion* **56**, 095012 (2014).

C. Paz-Soldan, M. J. Lanctot, N. C. Logan, D. Shiraki, R. J. Buttery, J. M. Hanson, R. J. La Haye, J. K. Park, W. M. Solomon, and E. J. Strait, "The importance of matched poloidal spectra to error field correction in DIII-D," *Physics of Plasmas (1994-present)* **21**, 072503 (2014).

E. J. Strait, R. J. Buttery, T. A. Casper, M. S. Chu, J. M. Hanson, A. M. Garofalo, Y. Gribov, R. J. La Haye, H. Reimerdes, M. J. Schaffer, and F. A. Volpe, "Measurement of tokamak error fields using plasma response and its applicability to ITER," *Nuclear Fusion* **54**, 073004 (2014).

S. R. Haskey, M. J. Lanctot, Y. Q. Liu, J. M. Hanson, B. D. Blackwell, and R. Nazikian, "Linear ideal MHD predictions for n = 2 non-axisymmetric magnetic perturbations on DIII-D," *Plasma Physics and Controlled Fusion* **56**, 035005 (2014).

M. A. Van Zeeland, N. M. Ferraro, W. W. Heidbrink, G. J. Kramer, D. C. Pace, X. Chen, T. E. Evans, R. K. Fisher, M. G. M. noz, J. M. Hanson, M. J. Lanctot, L. L. Lao, R. A. Moyer, R. Nazikian, and D. M. Orlov, "Modulation of prompt fast-ion loss by applied n = 2 fields in the DIII-D tokamak," *Plasma Physics and Controlled Fusion* **56**, 015009 (2014).

G. Matsunaga, M. Okabayashi, N. Aiba, J. A. Boedo, J. R. Ferron, J. M. Hanson, G. Z. Hao, W. W. Heidbrink, C. T. Holcomb, Y. In, G. L. Jackson, Y. Q. Liu, T. C. Luce, G. R. McKee, T. H. Osborne, D. C. Pace, K. Shinohara, P. B. Snyder, W. M. Solomon, E. J. Strait, A. D. Turnbull, M. A. V. Zeeland, J. G. Watkins, L. Zeng, the DIII-D Team, and the JT-60 Team, "Dynamics of energetic particle driven modes and MHD modes in wall-stabilized high-β plasmas on JT-60U and DIII-D," *Nuclear Fusion* **53**, 123022 (2013).

W. M. Solomon, P. A. Politzer, R. J. Buttery, C. T. Holcomb, J. R. Ferron, A. M. Garofalo, B. A. Grierson, J. M. Hanson, Y. In, G. L. Jackson, J. E. Kinsey, R. J. La Haye, M. J. Lanctot, T. C. Luce, M. Okabayashi, C. C. Petty, F. Turco, and A. S. Welander, "Access to high beta advanced inductive plasmas at low injected torque," *Nuclear Fusion* **53**, 093033 (2013).

J. R. Ferron, C. T. Holcomb, T. C. Luce, J. M. Park, P. A. Politzer, F. Turco, W. W. Heidbrink, E. J. Doyle, J. M. Hanson, A. W. Hyatt, Y. In, R. J. La Haye, M. J. Lanctot, M. Okabayashi, T. W. Petrie, C. C. Petty, and L. Zeng, "Progress toward fully noninductive discharge operation in DIII-D using off-axis neutral beam injection," *Physics of Plasmas* **20**, 092504 (2013).

M. J. Lanctot, R. J. Buttery, J. S. de Grassie, T. E. Evans, N. M. Ferraro, J. M. Hanson, S. R. Haskey, R. A. Moyer, R. Nazikian, T. H. Osborne, D. M. Orlov, P. B. Snyder, M. R. Wade, and the DIII-D Team, "Sustained suppression of type-I edge-localized modes with dominantly n = 2 magnetic fields in DIII-D," *Nuclear Fusion* **53**, 083019 (2013).

W. A. Cooper, I. T. Chapman, O. Schmitz, A. D. Turnbull, B. J. Tobias, E. A. Lazarus, F. Turco, M. J. Lanctot, T. E. Evans, J. P. Graves, D. Brunetti, D. Pfefferlé, H. Reimerdes, O. Sauter, F. D. Halpern, T. M. Tran, S. Coda, B. P. Duval, B. Labit, A. Pochelon, M. R. Turnyanskiy, L. Lao, T. C. Luce, R. Buttery, J. R. Ferron, E. M. Hollmann, C. C. Petty, M. van Zeeland, M. E. Fenstermacher, J. M. Hanson, and H. Lütjens, "Bifurcated helical core equilibrium states in tokamaks," *Nuclear Fusion* **53**, 073021 (2013).

F. Turco, C. T. Holcomb, J. R. Ferron, T. C. Luce, P. A. Politzer, J. M. Park, A. E. White, D. P. Brennan, A. D. Turnbull, J. M. Hanson, M. Okabayashi, and Y. In, "Sensitivity of transport and stability to the current profile in steady-state scenario plasmas in DIII-D," *Physics of Plasmas* **19**, 122506 (2012).

R. A. Moyer, M. A. V. Zeeland, D. M. Orlov, A. Wingen, T. E. Evans, N. M. Ferraro, J. M. Hanson, R. Nazikian, M. R. Wade, and L. Zeng, "Measurement of plasma boundary displacement by n = 2 magnetic perturbations using imaging beam emission spectroscopy," *Nuclear Fusion* **52**, 123019 (2012).

L. Piron, J. M. Hanson, Y. In, G. Marchiori, L. Marrelli, P. Martin, M. Okabayashi, P. Piovesan, H. Reimerdes, A. Soppelsa, and E. J. Strait, "Improved dynamic response of magnetic feedback in RFX-mod and DIII-D," *Plasma Physics and Controlled Fusion* **53**, 084004 (2011).

H. Reimerdes, J. W. Berkery, M. J. Lanctot, A. M. Garofalo, J. M. Hanson, Y. In, M. Okabayashi, S. A. Sabbagh, and E. J. Strait, "Evidence for the Importance of Trapped Particle Resonances for Resistive Wall Mode Stability in High Beta Tokamak Plasmas," *Phys. Rev. Lett.* **106**, 215002 (2011).

M. Okabayashi, G. Matsunaga, J. S. deGrassie, W. W. Heidbrink, Y. In, Y. Q. Liu, H. Reimerdes, W. M. Solomon, E. J. Strait, M. Takechi, N. Asakura, R. V. Budny, G. L. Jackson, J. M. Hanson, R. J. La Haye, M. J. Lanctot, J. Manickam, K. Shinohara, and Y. B. Zhu, "Off-axis fishbone-like instability and excitation of resistive wall modes in JT-60U and DIII-D," *Physics of Plasmas* **18**, 056112 (2011).

M. J. Lanctot, H. Reimerdes, A. M. Garofalo, M. S. Chu, J. M. Hanson, Y. Q. Liu, G. A. Navratil, I. N. Bogatu, Y. In, G. L. Jackson, R. J. La Haye, M. Okayabashi, J. K. Park, M. J. Schaffer, O. Schmitz, E. J. Strait, and A. D. Turnbull, "Measurement and modeling of three-dimensional equilibria in DIII-D," *Physics of Plasmas* **18**, 056121 (2011).

T. Sunn Pedersen, D. A. Maurer, J. Bialek, O. Katsuro-Hopkins, J. M. Hanson, M. E. Mauel, R. James, A. Klein, Y. Liu, and G. A. Navratil, "Experiments and modelling of external kink mode control using modular internal feedback coils," *Nuclear Fusion* **47**, 1293 (2007).