

THOMAS RICHARD JARBOE

EDUCATION:

1974 Ph.D. Plasma Physics, University of California, Berkeley
1967 B.S. Engineering Physics, University of Illinois, Urbana

HONORS:

Member, Sigma Tau and Tau Beta Pi
Fellow, American Physical Society

PRESENT POSITION:

January 1991-present Professor, Aeronautics & Astronautics, Adjunct Professor of Physics,
University of Washington

PREVIOUS POSITIONS:

August 1989- Professor, Nuclear Engineering, University of Washington
December 1990
Los Alamos National Laboratory, NM
1985-1989 Group leader, CTR-5
1983-1985 Deputy group leader
1982-1983 Associate group leader
1980-1982 Task leader
1974-1980 Staff member
1985-1986 Sabbatical leave, Culham Laboratory, UK
University of California, CA
1969-1974 Research Assistant
1967-1969 Teaching Assistant
Summer 1968 Physicist, Naval Weapons Center, China Lake, CA

SERVICE:

2014-present Advisory Board of General Fusion
2015-present University Fusion Association Excom
2005-present Director of the Plasma Science and Innovation (PSI) Center
2005-2010 Committee Chair of the Innovative Confinement Concepts (ICC)
2001-2003 President of University Fusion Association
2000-2003 NSO-PAC
2000-2003 VLT-PAC
1998-2000 University Fusion Association Excom
1998-2000 Member of APS/DDP Excom

PATENTS SUBMITTED AND/OR AWARDED:

09/05/17 U.S. patent "Plasma confinement system and methods for use"
(<https://patents.google.com/patent/US9754686B2/en>).
Patent number is **US9754686B2**.

INVITED PAPERS:

The Exploratory Plasma and Fusion Research Workshop “Applying the new HIT results to other plasmas” February 2016.

“Possibility of good confinement with imposed dynamo current drive and the implications for fusion”, Princeton Plasma Physics Laboratory, September 29, 2013.

“Sustained spheromak with good confinement using imposed dynamo current drive”, Spherical Torus Workshop, York, UK, September 18, 2013

“Possibility of good confinement with imposed dynamo current drive and the implications for fusion”, General Fusion, Vancouver, Canada, August 21, 2013.

“Imposed dynamo current drive”, Presented an Invited talk at the Workshop on Exploratory Topics in Plasma & Fusion Reserch (EPR2013), Feb. 2013.

“Progress on HIT-SI and Imposed Dynamo Current Drive” Presented an invited talk at the Internal Atomic Energy Agency (IAEA) -24th Fusion Energy Conference, San Diego, Oct. 2012. (This is a very prestigious meeting. All of the world’s fusion research reports here with no parallel sessions. The papers are very selective.)

“Spheromak Confinement Device” presented as an Invited Tutorial at APS, Nov. 2004.

“Relaxation in Magnetic Confinement Experiments” presented at the Innovative Confinement Concepts (ICC) Workshop, May 25, 2004.

“Steady Inductive Helicity Injection Current Drive”, presented at the Fusion Power Associates Annual Meeting and Symposium, Frontiers in Fusion Research, Washington D.C., September 25-26, 2001.

4th Symposium Current Trends in International Fusion Research, Washington, DC, March 2001.

Controlled Fusion poster by HIT and talk by Roger Raman on NSTX work, presented at the 18th IAEA Conference in Sorrento, Italy, October 4-10, 2000.

“The Helicity Injected Torus with Steady Inductive Helicity Injection Current Drive (HIT-SI)”, Workshop on Confinement and Stability of Alternative Fusion Concepts, Varenna, Italy, October 15, 2000.

“The Helicity Injected Torus Program at the University of Washington” Plasma Physics Division, Institute of Physics, Chinese Academy of Sciences, Beijing University, China, October 22, 1999.

“The Steady Inductive Helicity Injection and Its Application to a High Beta Spheromak”, October 25, 1999.

“Current Drive Experiments on the HIT-II Spherical Torus” at the 17th International Atomic Energy Agency(IAEA) on Fusion Energy, Yokohama, Japan, October 19-24 1998 (This is a very prestigious meeting. All of the world’s fusion research reports here with no parallel sessions. The papers are very selective.)

“Steady inductive helicity injection on a high beta spheromak” at the US/Japan Workshop on Spherical Torii, and IAEA Technical Committee Meeting on Spherical Torii. Held in Tokyo and hosted by the University of Tokyo.

- “Results from Current Drive Experiments on the Helicity Injected Torus” presented at the APS Meeting in Kansas City, MO, March 17-21, 1997.
- “Formation and Sustainment of a Low Aspect Ratio Tokamak by Coaxial Helicity Injection” presented at the 15th International Conference on Plasma Physics and Controlled Nuclear Fusion Research, Seville, Spain, September 26-October 1, 1994.
- “HIT U,” Workshop on Establishing the Physics Basis Needed to Access the Potential of Compact Toroidal Reactors, Fusion Energy Design Center, Oakridge National Lab, Oakridge, TN, July 19, 1994.
- “Overview of Spheromak Physics,” Workshop on Establishing the Physics Basis Needed to Access the Potential of Compact Toroidal Reactors, Fusion Energy Design Center, Oakridge National Lab, Oakridge, TN, July 19, 1994.
- “The Formation and Sustainment of a 75kA Tokamak by Coaxial Helicity Injection,” IAEA Technical Committee Meeting on Research Using Small Tokamaks, Serra Negra, Brazil, October 25-26, 1993.
- “Hot Ions in the CTX Spheromak,” presented at the US-Japan Workshop on Anomalous Ion Heating and Related Topics, Madison, WI, March 2-4, 1992.
- “Advances in Spheromak Understanding and Parameters Achieved,” presented at the 31st Annual Meeting of Division of Plasma Physics, Anaheim, CA, Nov. 13-17, 1989.
- “Introduction to Spheromak and the CTX Experiment,” presented at the International School of Plasma Physics, Workshop on Physics of Mirrors, Reverse Field Pinches, and Compact Tori, Varenna, Italy, Sept. 1-11, 1987.
- “Spheromak Sustainment by DC Helicity Injection,” presented at the Japan-US Workshop on Advanced Current Drive Concepts, Kyoto, Japan, Nov. 21-22, 1986.
- “Recent Advances in Spheromak Physics from the Los Alamos Spheromak Program,” presented at the 27th Annual Meeting of Division of Plasma Physics of the American Physical Society, San Diego, CA, Nov. 4-8, 1985.
- “Evidence for Helicity Conservation in Spheromak Experiments,” presented at the Gordon Conference on Plasma Physics, New London, NH, June 10-14, 1985.
- “Spheromak Studies on CTX,” presented at the Tenth IAEA International Conference on Plasma Physics and Controlled Nuclear Fusion Research, London, UK, Sept. 12-14, 1984.
- “Spheromak Studies on CTX,” presented at the Fifth US-Japan Joint Symposium on Compact Toroid Research, Princeton, NJ, Feb. 20-23, 1984.
- “Spheromak Equilibrium, Stability, and Lifetime,” presented at the Fifth Symposium on Physics and Technology of Compact Toroids, Bellevue, WA Nov. 16-18, 1982.
- “Los Alamos Compact Toroid (CT) Research on the Field Reversed Configuration (FRC) and Spheromak Type, Magnetized Gun-Generated CTs,” presented at the Tenth European Conference on Controlled Fusion and Plasma Physics, Moscow, USSR, Sept. 14-19, 1981.
- “Spheromak Experiment: Equilibrium and Stability,” presented at the Third Symposium on Physics and Technology of Compact Toroids, Los Alamos, NM, Dec. 2-4, 1980.

“Generation and Laboratory Study of Spheromak Plasma at Los Alamos,” presented at the American Physical Society, 22nd Annual Meeting of Division of Plasma Physics, San Diego, CA, Nov. 10-14, 1980.

“Gun-Generated Compact Tori at Los Alamos,” presented at the Reverse Field Pinch Theory Workshop, Los Alamos, NM, April 28-May 2, 1980.

“Production of Field-Reversed Configuration with a Magnetized Coaxial Plasma Gun,” presented at the International Symposium on Physics in Open Ended Fusion System, Tsukuba, Japan, April 15-18, 1980.

“Magnetized Gun Experiment,” presented at the US-Japan Joint Symposium on Compact Toruses and Energetic Particle Injection, Princeton, NJ, Dec. 12-14, 1979.

PUBLICATIONS: († indicates supervised by Jarboe)

1. †R. Raman, W.-S. Lay, **T.R. Jarboe**, J.E. Menard and M. Ono “Electromagnetic particle injector for fast time response disruption mitigation in tokamaks” *Nuclear Fusion*, **59**, 2018.
2. †K. Kuroda, R Raman, K Hanada, M Hasegawa, T Onchi, M Ono, B A Nelson, **T R Jarboe**, M Nagata, O Mitarai, K Nakamura, H Idei, J Rogers, S Kawasaki, T Nagata, A Kuzmin, S Kojima, C Huang, O Watanabe, A Higashijima, Y Takase, A Fukuyama and S Murakami “Initial results from solenoid-free plasma start-up using Transient CHI on QUEST” *Plasma Phys. Control. Fusion* **60**, 115001, 2018.
3. †Aaron Hossack, Rian Chandraa, Chris Everson, and **Tom Jarboe** “Improvements to the ion Doppler spectrometer diagnostic on the HIT-SI experiments” *Review of Scientific Instruments* **89**, 035107, 2018.
4. †Roy Taylor, J. Nathan Kutz, Kyle Morgan, and Brian A. Nelson “Dynamic mode decomposition for plasma diagnostics and validation” *Rev. Sci Inst.* **89**, 053501, 2018.
5. †K. D. Morgan, **T. R. Jarboe**, A. C. Hossack, R. N. Chandra, and C. J. Everson “Validation of extended magnetohydrodynamic simulations of the HIT-SI3 experiment using the NIMROD code” *Phys. of Plasmas* **24**, 122510, 2017.
6. † K. Kuroda, R. Raman, K. Hanada, M. Hasegawa, T. Onchi, M. Ono, **T. Jarboe**, B. A. Nelson, M. Nagata, O. Mitarai, K. Nakamura, H. Idei, J. Rogers, S. Kawasaki, T. Nagata, A. Kuzmin, S. Kojima, O. Watanabe, A. Higashijima, Y. Takase and A. Fukuyama “Current Start-Up Using the New CHI System” *Plasma and Fusion Research: Rapid Communications* **12**, 1202020, 2017.
7. †A.C. Hossack, D. A. Sutherland and, and **T. R. Jarboe** “Derivation of dynamo current drive in a closed-current volume and stable current sustainment in the HIT-SI experiment” *Phys. Plasmas* **24**(2), 020702, 2017.
8. †R. Raman, **T. R. Jarboe**, J. E. Menard, M. Ono, G. Taylor. B. A. Nelson. D. Mueller, T. Brown “Simplifying the ST and AT Concepts” *J Fusion Energy* **35**(1), 34–40, 2016.
9. †D. Elliott, D. Sutherland, U. Siddiqui, E. Scime, C. Everson, K. Morgan, A. Hossack, B. Nelson, and **T. Jarboe** “Two-photon LIF on the HIT-SI3 experiment: Absolute density and temperature measurements of deuterium neutrals” *Rev. Sci. Instrum*, **87**(11), 11E506. 2016.

10. **T. R. Jarboe**, B. A. Nelson, and D. A. Sutherland “A mechanism for the dynamo terms to sustain closed-flux current, including helicity balance, by driving current which crosses the magnetic field” *Phys. Plasmas* **22**, 072503, 2015.
11. †R Raman, T Brown, LA El-Guebaly, **TR Jarboe**, BA Nelson, JE Menard “Design Description for a Coaxial Helicity Injection Plasma Start-Up System for a ST-FNSF” *Fusion Science and Technology* **68**, 674-679, 2015.
12. †R Raman, **TR Jarboe**, JE Menard, SP Gerhardt, M Ono, L Baylor, W-S Lay “Fast Time Response Electromagnetic Disruption Mitigation Concept” *Fusion Science and Technology* **68**, 797-805, 2015.
13. †C Hansen, B Victor, K Morgan, **T Jarboe**, A Hossack, G Marklin, BA Nelson, D Sutherland “Numerical studies and metric development for validation of magnetohydrodynamic models on the HIT-SI experimenta” *Phys. Plasmas* **22**, 056105, 2015.
14. †C Hansen, G Marklin, B Victor, C Akcay, T Jarboe “Simulation of injector dynamics during steady inductive helicity injection current drive in the HIT-SI experiment” *Phys. Plasmas* **22**, 042505, 2015.
15. †B S Victor, C Akcay, C J Hansen, T R Jarboe, B A Nelson and K D Morgan, “Development of validation metrics using biorthogonal decomposition for the comparison of magnetic field measurements” *Plasma Phys. Control. Fusion* **57**, 045010, 2015.
16. †D.A. Sutherland, **T.R. Jarboe**, K.D. Morgan, M. Pfaff, E.S. Lavine, Y. Kamikawa, M. Hughes, P. Andrist, G. Marklin, B.A. Nelson “The dynamak: An advanced spheromak reactor concept with imposed-dynamo current drive and next-generation nuclear power technologies” *Fusion Engineering and Design* **89**, 412-425, 2014.
17. †B. S. Victor, **T. R. Jarboe**, C. J. Hansen, C. Akcay, K. D. Morgan, A. C. Hossack and B. A. Nelson “Sustained spheromaks with ideal $n = 1$ kink stability and pressure confinement” *Phys. Plasmas* **21**, 082504, 2014.
18. †R. Raman, **T. R. Jarboe**, B. A. Nelson, D. Mueller, S. C. Jardin, C. Neumeyer, M. Ono and J. E. Menard “Design Details of the Transient CHI Plasma Start-up System on NSTX-U” *Ieee Transactions On Plasma Science* **42**, 2154-2160, 2014.
19. **T. R. Jarboe**, C. J. Hansen, A. C. Hossack, G. J. Marklin, K. D. Morgan, B. A. Nelson, D. A. Sutherland, and B. S. Victor “A proof of principle of imposed Dynamo current drive: Demonstration of sufficient confinement” *Fusion Science and Technology* **66**, 369-384, 2014.
20. †R. Raman, D. Mueller, S.C. Jardin, **T.R. Jarboe**, B.A. Nelson, M.G. Bell, S.P. Gerhardt, E.B. Hooper, S.M. Kaye, C.E. Kessel, J.E. Menard, M. Ono, V. Soukhanovskii, and the NSTX Research Team “Non-inductive plasma start-up on NSTX and projections to NSTX-U using transient CHI” *Nuclear Fusion* **53**, 073017, 2013.
21. †J. S. Wrobel, C. J. Hansen, **T. R. Jarboe**, R. J. Smith, A. C. Hossack, B. A. Nelson, G. J. Marklin, D. A. Ennis, C. Akcay, and B. S. Victor “Relaxation-time measurement via a time-dependent helicity balance model” *Physics of Plasmas* **20**, 012503, 2013.
22. †C. Akcay, Charlson C. Kim, Brian S. Victor and **T. R. Jarboe** “Validation of single-fluid and two-fluid magnetohydrodynamic models of the helicity injected torus spheromak experiment with the NIMROD code” *Phys. Plasmas* **20**, 082512, 2013.

23. †Aaron C. Hossack, Taylor Firman, Thomas R. Jarboe, James R. Prager, Brian S. Victor, Jonathan S. Wrobel, and Timothy Ziemba “Reduction of plasma density in the Helicity Injected Torus with Steady Inductance experiment by using a helicon pre-ionization source” *Rev. Sci. Instrum.* **84**, 103506, 2013.
24. **T.R. Jarboe**, B.S. Victor, B.A. Nelson, C.J. Hansen, C. Akcay, D.A. Ennis, N.K. Hicks, A.C. Hossack, G.J. Marklin and R.J. Smith “Imposed-dynamo current drive” *Nucl. Fusion* **52**, 083017, 2012.
25. **T.R. Jarboe**, C. Akcay, M.A. Chilenski, D.A. Ennis, C.J. Hansen, N.K. Hicks, R.Z. Aboul Hosn, A.C. Hossack, G.J. Marklin, B.A. Nelson, R.G. O’Neill, P.E. Sieck, R.J. Smith, B.S. Victor, J.S. Wrobel and M. Nagata “Recent results from the HIT-SI experiment” *Nucl. Fusion* **51**, 063029, 2011.
26. †B.A. Nelson, **T.R. Jarboe**, D. Mueller, R. Raman, M. Bell, J. Menard, M. Ono, A.L. Roquemore, V. Soukhanovskii, H. Yuh and the NSTX Research Team “Demonstration of 300 kA CHI-startup current, coupling to transformer drive and flux savings on NSTX” *Nucl. Fusion* **51**, 063008, 2011.
27. †R. Raman, D. Mueller, B. A. Nelson, **T. R. Jarboe**, S. Gerhardt, H. W. Kugel, B. Leblanc, et al. “Demonstration of Tokamak Ohmic Flux Saving By Transient Coaxial Helicity Injection in the National Spherical Torus Experiment” *Phys. Rev. Lett* **104**, 095003, 2010.
28. †B. S. Victor, **T. R. Jarboe**, A. C. Hossack, D. A. Ennis, B. A. Nelson, R. J. Smith, C. Akcay, C. J. Hansen, G. J. Marklin, N. K. Hicks, and J. S. Wrobel “Evidence for Separatrix Formation and Sustainment with Steady Inductive Helicity Injection” *Phys. Rev. Lett.* **107**, 165005, 2011.
29. **T.R. Jarboe** “An explanation of closed-flux formation and sustainment using coaxial helicity injection on HIT-II” *Plasma Physics and controlled Fusion* **52**, 045001, 2010.
30. Dennis Mueller, Michael G. Bell, Ronald Bell, Benoit P. LeBlanc, Alvin L. Roquemore, Roger Raman, **Thomas R. Jarboe**, Brian A. Nelson, Steven A. Sabbagh, and Vlad Soukhanovskii “Ramp-Up of CHI-Initiated Plasmas on NSTX” *IEEE Transactions on Plasma Science*, **38**, 371-374, 2010.
31. †D.A. Ennis, B.S. Victor, J.S. Wrobel, C. Akcay, **T.R. Jarboe**, G.J. Marklin, B.A. Nelson and R.J. Smith “New understandings and achievements from independent-injector drive experiments on HIT-SI 2010” *Nucl. Fusion* **50**, 072001, 2010.
32. †R. Raman, D. Mueller, B. A. Nelson, T. R. Jarboe, S. Gerhardt, H. W. Kugel, B. LeBlanc, R. Maingi, J. Menard, M. Ono, S. Paul, L. Roquemore, S. Sabbagh, V. Soukhanovskii, and NSTX Research Team “ Ohmic Flux Saving by Transient Coaxial Helicity Injection in the National Spherical Torus Experiment” *Phys. Rev. Lett.* **104**, 095003, 2010.
33. †R. Raman, **T.R. Jarboe**, D. Mueller, B.A. Nelson, M.G. Bell, R. Bell, D. Gates, S. Gerhardt, J. Hosea, et al. “Solenoid-Free Plasma Startup in NSTX Using Transient CHI” *Nuclear Fusion* **49**, 065006, 2009.
34. †A. J. Redd, **T. R. Jarboe**, R. Z. Aboul Hosn, C. Akcay, W. T. Hamp, G. J. Marklin, B. A. Nelson, R. G. O’Neill, P. E. Sieck, R. J. Smith, B. T. Stewart and J. S. Wrobel “Internal Fields in Helicity Injected Torus with Steady Inductive Helicity Injection (HIT-SI) Discharges” *J Fusion Energ* **27**, 100-103, 2008.

35. †A. J. Redd, **T. R. Jarboe**, W. T. Hamp, B. A. Nelson, R. G. O'Neill, and R. J. Smith "Flux Amplification in Helicity Injected Torus (HIT-II) Coaxial Helicity Injection Discharges" *Phys. Plasmas* **15**, 022506, 2008.
36. †W. T. Hamp, **T. R. Jarboe**, B. A. Nelson, R. G. O'Neill, R. Raman, A. J. Redd, B. T. Stewart, and D. Mueller, "Temperature and density characteristics of the Helicity Injected Torus-II-spherical tokamak indicating closed flux sustainment using coaxial helicity injection", *Phys. Plasmas* **15**, 082501, 2008.
37. †R. Raman, **T. R. Jarboe**, B. A. Nelson, D. Mueller, M. G. Bell, M. Ono "Plasma Start-Up in HIT-II and NSTX Using Transient Coaxial Helicity Injection" *J. Fusion Energy* **27**, 96-99, 2008.
38. †R. Raman, **T. R. Jarboe**, D. Mueller, B. A. Nelson, M. G. Bell, M. Ono, T. Bigelow, R. Kaita, B. LeBlanc, R. Maqueda, J. Menard, S. Paul, L. Roquemore, and The NSTX Research Team "Plasma Startup in the National Spherical Torus Experiment Using Transient Coaxial Helicity Injection" *Phys. Plasmas*, **14**, 056106, 2007.
39. D. Mueller, R. Raman, M.G. Bell, T. Jarboe, B. Leblanc, R. Maqueda, S. Sabbagh, B.A. Nelson "NSTX Plasma Start-Up Using Transient Coaxial Helicity Injection" *Fusion Sci Tech.* **52**, 393-397, 2007.
40. †R. Raman, D. Mueller, **T.R. Jarboe**, B.A. Nelson, M.G. Bell, M. Ono, T. Bigelow, R. Kaita, B. LeBlanc, K.C. Lee, R. Maqueda, J. Menard, S. Paul, L. Roquemore "Non-Inductive Solenoid-Less Plasma Startup in NSTX Using Transient CHI" *Nucl. Fusion* **47**, 792-799, 2007.
41. †R. G. O'Neill, G. J. Marklin, **T. R. Jarboe**, C. Akcay, W. T. Hamp, B. A. Nelson, A. J. Redd, R. J. Smith, B. T. Stewart, and J. S. Wrobel "A Fully Relaxed Helicity Balance Model for an Inductively Driven Spheromak" *Phys. Plasmas* **14**, 112304, 2007.
42. †R. J. Redd, **T. R. Jarboe**, B. A. Nelson, R. G. O'Neill, and R. J. Smith "Coaxial Helicity Injection in Open-Flux Low-Aspect-Ratio Toroidal Discharges" *Phys. Plasmas* **14**, 112511, 2007.
43. M. Nagata, R. Raman, V. Soukhanovskii, B.A. Nelson, R. E. Bell, D. Mueller, **T.R. Jarboe**, M.G. Bell, The NSTX Research Team "E \times B plasma Rotation And N = 1 Oscillation Observed in the NSTX-CHI Experiments" *Plasma Fusion Research* **2**, 035, 2007.
44. †R. G. O'Neill, R. J. Smith, C. Akcay, W. T. Hamp, R. Z. Aboul Hosn, **T. R. Jarboe**, A. J. Redd, P. E. Sieck, G. L. Sutphin, J. S. Wrobel "Overview of HIT-SI Diagnostic Systems" *J Fusion Energ.* **26**, 131-133, 2007.
45. †R. Raman, **T. R Jarboe**, W. T. Hamp, A. J. Redd, B. A. Nelson, R. G. O'Neill, P. E. Sieck, and R. J. Smith "Transient Coaxial Helicity Injection for Solenoid-Free Plasma Startup in HIT-II" *Phys. Plasmas* **14**, 022504, 2007.
46. †R. Raman, **T. R. Jarboe**, B. A. Nelson, M. G. Bell, D. Mueller "Solenoid-free Plasma Start-up in HIT-II and NSTX using Transient CHI" *J. Fusion Ener.* **26**, 159-162, 2007.
47. †A. J. Redd, **T. R. Jarboe**, W. T. Hamp, B. A. Nelson, R. G. O'Neill, P. E. Sieck, R. J. Smith, G. L. Sutphin, J. S. Wrobel "Overview of the Helicity Injected Torus (HIT) Program" *J Fusion Energ* **26**, 163-168, 2007.

48. †R. Raman, D. Mueller, T.R. Jarboe, B.A. Nelson, M.G. Bell, M. Ono, T. Bigelow, R. Kaita, B. LeBlanc, K.C. Lee, R. Maqueda, J. Menard, S. Paul, L. Roquemore “Non-inductive solenoid-less plasma current startup in NSTX using transient CHI” *Nucl Fusion* **47**, 792-799, 2007.
49. †P.E. Sieck, **T.R. Jarboe**, V. A. Izzo, W.T. Hamp, B.A. Nelson, R.G. O’Neill, A.J. Redd and R.J. Smith “Demonstration of Steady Inductive Helicity Injection” *Nucl Fusion*, **46**, 254-261, 2006.
50. †C. T. Holcomb, **T. R. Jarboe**, D. N. Hill, S. Woodruff, and R. D. Wood “Sustained Spheromak Coaxial Gun Operation in the Presence of an n=1 Magnetic Distortion” *Phys Plasmas*, **13**, 022504, 2006.
51. D. A. Gates, R. Maingi, J. Menard, S. Kaye, S. A. Sabbagh, G. Taylor, J. R. Wilson, M. G. Bell, R. E. Bell, S. Bernabei, J. Bialek, T. Biewer, W. Blanchard, J. Boedo, C. Bush, M. D. Carter, W. Choe, N. Crocker, D. S. Darrow, W. Davis, L. Delgado-Aparicio, S. Diem, J. Ferron, A. Field, J. Foley, E. D. Fredrickson, R. Harvey, R. E. Hatcher, W. Heidbrink, K. Hill, J. C. Hosea, **T. R. Jarboe**, D. W. Johnson, et.al. “Effect of plasma shaping on performance in the National Spherical Torus Experiment” *Phys Plasmas* **13**, 056122, 2006.
52. **T. R. Jarboe**, W. T. Hamp, G. J. Marklin, B. A. Nelson, R. G. O’Neill, A. J. Redd, P. E. Sieck, R. J. Smith, and J. S. Wrobel “Spheromak Formation by Steady Inductive Helicity Injection” *Phys Rev. Lett.* **97**, 115003, 2006.
53. †R. Raman, B. A. Nelson, M. G. Bell, **T. R. Jarboe**, D. Mueller, T. Bigelow, B. LeBlanc, R. Maqueda, J. Menard, M. Ono, and R. Wilson “Efficient Generation of Closed Magnetic Flux Surfaces in a Large Spherical Tokamak Using Coaxial Helicity Injection” *Phys Rev Lett*, **97**, 175002, 2006.
54. †H. Kim, V. Cellamare, **T. R. Jarboe**, A. T. Mattick “Refractory Clad Transient Internal Probe for Magnetic Field Measurements in High Temperature Plasmas” *Review of Scientific Instruments* **76**, 053504, 2005.
55. †P. E. Sieck, W. T. Hamp, V. A. Izzo, **T. R. Jarboe**, B. A. Nelson, R. G. O’Neill, A. J. Redd, and R. J. Smith “Initial Studies of Steady Inductive Helicity Injection on the HIT-SI Experiment” *IEEE Transactions on Plasma Science* **33**, 723-728, 2005.
56. †R. G. O’Neill, A. J. Redd, W. T. Hamp, R. J. Smith, and **T. R. Jarboe** “Ion Heating During Magnetic Relaxation in the Helicity Injected Torus-II Experiment” *Phys. Plasmas* **12**, 122506, 2005.
57. **T.R. Jarboe**, “The Spheromak Confinement Device” *Phys Plasma*, **12**, 20736637, 2005.
58. †V. A. Izzo and **T. R. Jarboe**, “Three-Dimensional Magnetohydrodynamics simulations of the Helicity Injected Torus with Steady Inductive Drive” *Phys Plasma*, **12**, 056109, 2005.
59. †R. Raman, **T.R. Jarboe**, R.G. O’Neill, W.T. Hamp, B.A. Nelson, V.A. Izzo, A.J. Redd, P.E. Sieck and R.J. Smith “Non-Inductive Solenoid-Free Plasma Start-Up Using Coaxial Helicity Injection” *Nucl. Fusion* **45**, L15-L19, 2005.

60. **Jarboe T. R.**, Parker K. M., Mattick T. A., Craw M. M., Gu P., Hamp W. T., Hwang A. A., Izzo V. A., Jewell P. D., Kim H., Melnik P. A., Sieck P. E., Takeda T., Tran C. T. "Spheromak Fusion Propulsion for Future Solar System Exploration" *AIAA Journal of Propulsion and Power* **21**, 218-229, 2005.
61. S.M. Kaye, M.G. Bell, R.E. Bell, S. Bernabei, J. Bialek, T. Biewer, W. Blanchard, J. Boedo, C. Bush, M.D. Carter, W. Choe, N. Crocker, D.S. Darrow, W. Davis, L. Delgado-Aparicio, S. Diem, J. Ferron, A. Field, J. Foley, E.D. Fredrickson, D.A. Gates, T. Gibney, R. Harvey, R.E. Hatcher, W. Heidbrink, K. Hill, J.C. Hosea, **T.R. Jarboe** et al. "Progress towards high performance plasmas in the National Spherical Torus Experiment (NSTX)" *Nuclear Fusion* **45**, S168-S180, 2005.
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