

Jeremy M. Hanson

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Education

Ph. D. Applied Physics, May 2009.
Columbia University (New York, NY)

Advisor: Professor Gerald A. Navratil

Thesis: "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 experiment, May 2011 – present

Postdoctoral Fellow, DIII-D experiment, May 2009 – May 2011.

- Designed, implemented, and maintained realtime control algorithms in the DIII-D plasma control system.
- Planned, executed, and assisted in DIII-D experiments in session leader, data analysis, plasma control roles.
- Jointly affiliated with Oak Ridge Insitute for Science and Education, May 2009 – May 2011

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

- Created tokamak plasmas.
- Designed and implemented a Kalman filter feedback algorithm for control of plasma instabilities.
- Assisted with administration of Linux and VMS data-acquisition and analysis servers.

Teaching Assistant, Computational Mathematics and Physics, January 2005 – May 2005.

Teaching Assistant, Applied Linear Algebra, September 2004 – December 2004.

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

UW-Madison Plasma Physics Group

Lab Hourly, January 2001 – August 2004.

Computer Skills

- C, HTML, IDL, LaTeX, Matlab, MDSplus, LabVIEW, Unix/Linux, VMS.

Publications

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,” *Nuclear Fusion* **52** (2012) 013003.

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** (2011) 084004.

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

J. M. Hanson, A. J. Klein, M. E. Mael, 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** (2009) 043503.

J. M. Hanson, B. DeBono, R. W. James, J. P. Levesque, M. E. Mael, D. A. Maurer, G. A. Navratil, T. Sunn Pedersen, D. Shiraki, “Feedback suppression of rotating external kink instabilities in the presence of noise,” *Physics of Plasmas* **15** (2008) 080704.

Presentations

“Uncovering RWM Stability Limits in Tokamaks.” Invited talk given at the 16th Workshop on MHD Stability Control at General Atomics, San Diego, CA on Nov 21, 2011.

“Feedback Control of Rotating External Kink Modes using a Kalman Filter.” Talk given for the University of Wisconsin–Madison Plasma Physics Seminar, 26 January 2009.

“Feedback Suppression of Rotating External Kink Modes in the Presence of Noise,” *Bull. Amer. Phys. Soc.* Paper BI2.00004 (2008). Invited talk given at the 50th annual meeting of the Division of Plasma Physics in Dallas, TX on Nov 17, 2008.

“A Kalman filter for active feedback on rotating external kink instabilities in a tokamak plasma.” Talk given at the Workshop on Active Control of MHD Stability at Columbia University, New York, NY on Nov 18, 2007.

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)