

Zachary S. Hartwig

hartwig@psfc.mit.edu

+1 314 922 6495 (cell)

+1 617 253 5471 (work)

77 Massachusetts Ave, NW17-115, Cambridge MA 02139

<http://www.psfc.mit.edu/~hartwig>

RESEARCH INTERESTS	Advancing radiation detection and particle transport simulation to solve complex problems in nuclear science and engineering <ul style="list-style-type: none">• Plasma-material interactions in magnetic fusion• Conceptual designs for magnetic fusion energy• Ion beam materials analysis• Production of fundamental nuclear data• Radiation detection for nuclear security• Particle and radiation detectors• Monte Carlo particle transport simulations• Digital data acquisition and pulse processing	
EDUCATION	Ph.D. in Nuclear Science , MIT. February 2014. <ul style="list-style-type: none">• Concentration: Fusion nuclear science• GPA: 4.7 / 5.0• Thesis: <i>An in-situ accelerator-based diagnostic for plasma-material interactions in fusion devices</i>	B.A. in Physics , Boston University. May 2005. <ul style="list-style-type: none">• Concentration: Experimental particle physics• GPA: 3.7 / 4.0• Degree awarded <i>summa cum laude</i>• Dean's List all 8 semesters
SELECTED PUBLICATIONS	<ul style="list-style-type: none">• Z.S. Hartwig <i>et al.</i> <i>An in-situ accelerator-based diagnostic for plasma-material interactions on magnetic fusion devices.</i> Rev. Sci. Instr. 84 (2013) 123503.• Z.S. Hartwig <i>et al.</i> An initial study of demountable, high-temperature superconducting magnets for the Vulcan tokamak conceptual design. <i>Fusion Engineering and Design</i>, 87 (2012) 201-214.• Z.S. Hartwig and P. Gumplinger. <i>Simulating response functions and pulse shape discrimination for organic scintillation detectors with Geant4.</i> Nucl. Instr. and Meth. A 737 (2014) 155.• Z.S. Hartwig and Y.A. Podpaly. <i>The Magnetic Fusion Energy Formulary.</i> Independently published. Available online at: http://www.psfc.mit.edu/research/MFEFormulary	
SELECTED ACHIEVEMENTS	<ul style="list-style-type: none">• <i>Recipient</i>, U.S. Department of Energy ORISE Postdoctoral Fellowship, Jan 2015.• <i>Recipient</i>, MIT NSE Del Favero Prize in Nuclear Science and Engineering, May 2014.• <i>Fellow</i>, 2013 Kavli Frontiers of Science.• <i>USA Cycling National Champion</i>, Collegiate Track Division II Team Omnium. September 2012.• <i>Recipient</i>, MIT NSE Special Award, Excellence in Science Communication and Policy. May 2012.• <i>Recipient</i>, MIT International Science and Technology Initiative Global Seed Fund Grant. May 2011.• <i>Recipient</i>, Boston University Alumni Prize for Excellence in Physics. May 2005.	
COMPUTER EXPERTISE	Programming Languages <ul style="list-style-type: none">• C, C++, Python, IPython, Open MPI, Unix shell scripting, GNU make, Matlab, IDL Particle Transport and Nuclear Physics Codes <ul style="list-style-type: none">• Geant4, MCNP5/X, DAGMC CAD-based neutronics, SRIM/TRIM, EASY, NJOY, TALYS, EMPIRE Data Analysis and Storage Frameworks <ul style="list-style-type: none">• ROOT, MDSplus; lead developer of the ADAQ tool suite Computer-Aided Design (CAD) and Analysis <ul style="list-style-type: none">• Solid Edge ST5, CUBIT Tool Suite, COMSOL Multiphysics 4 Productivity Software <ul style="list-style-type: none">• Windows OS, Linux OS (Fedora, RHEL, Ubuntu), Emacs, Subversion, Git, GitHub, L^AT_EX,	
HARDWARE EXPERTISE	Data Acquisition <ul style="list-style-type: none">• CAEN S.p.A. data acquisition systems, Tektronix digital oscilloscopes Particle Detector Construction <ul style="list-style-type: none">• Scintillator crystals, photomultiplier tubes, silicon avalanche photodiodes, silicon photomultiplier, signal preamplifiers, soldering, basic machining, vacuum hardware, test platforms	
LEADERSHIP EXPERIENCE	<ul style="list-style-type: none">• <i>Teaching assistant</i>: MIT 22.105: Electromagnetic Interactions. Fall 2010.• <i>Teaching assistant</i>: MIT 22.63: Engineering Principles for Fusion Reactors. Spring 2012.• <i>Graduate advisor</i>: MIT Undergraduate Research Opportunities Program (UROP) and student theses.• <i>Organizer</i>: U.S. fusion student advocacy trip to 30 Congressional offices in Washington DC. June 2012.• <i>Mediator</i> in conflict resolution, MIT Resistance for Easing Friction and Stress Program. January 2010.	