

Alexander George Roy Thomas

CONTACT INFORMATION

**Department of Nuclear Engineering and Radiological Sciences
and Center for Ultrafast Optical Science**

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CITIZENSHIP STATUS

Permanent resident of the *United States of America*
Citizen of the UK

RESEARCH INTERESTS

Laser-Plasma Interactions: Ultra-high intensity laser-plasma interactions, compact laser-plasma based particle accelerators, particle-in-cell simulation, laser propagation in plasma at high intensity, inertial confinement fusion, Vlasov-Fokker-Planck modeling, non-local transport, and magnetized plasmas.
Compact Radiation Sources: Laser-plasma radiation sources, radiation reaction force at high field strengths, radiation generation computational modeling.

EMPLOYMENT

2008-Present, Assistant Professor, University of Michigan
2006-2008, Research Associate, Plasma Physics Group, Imperial College London

EDUCATION

2007, Diploma of Imperial College, Imperial College London
2003-2006, PhD Plasma Physics, Imperial College London (Awarded 2007)
1998-2002, MSci (Hons) Physics (First Class), Imperial College London

HONORS AND AWARDS

2012, Air Force Office of Scientific Research Young Investigator Program
2011, National Science Foundation Faculty Early Career Development Program
2008, NERSC of Canada, Postdoctoral Fellowship (declined)
2007, European Physical Society Plasma Physics Division PhD Research Award
2002, Imperial College Entrepreneurs' Challenge (LIDAR Technologies, First Place)

TEACHING EXPERIENCE

Imperial College London

2006-2007, Laboratory demonstrator, 3rd year Computing laboratory.
2007-2008, 3rd year tutorials - tutored 6 groups of 4 in comprehensive physics.

University of Michigan

As sole instructor

Fall 2008, NERS 211, An Introduction to Nuclear Engineering and Radiological Sciences.

Winter 2009, NERS 590-3, Special Topics, Computational Plasma Physics.

Fall 2009, NERS 211, An Introduction to Nuclear Engineering and Radiological Sciences.

Winter 2010, NERS 590-3, Special Topics, Computational Plasma Physics.

Fall 2010, NERS 211, An Introduction to Nuclear Engineering and Radiological Sciences.

Winter 2011, NERS 590-3, Special Topics, Computational Plasma Physics.

Fall 2011, ENGR 100-850, An introduction to the Engineering Profession.

Winter 2012, NERS 250, Fundamentals of Nuclear Engineering and Radiological Sciences.

As guest lecturer

Winter 2009, NERS 250, Fundamentals of Nuclear Engineering and Radiological Sciences: *Presentation on High Field Physics.*

Fall 2010, ENG 110, The Engineering Profession:
Lecture on Nuclear Engineering.

Fall 2011, ENG 110, The Engineering Profession:
2 lectures on Nuclear Engineering.

STUDENTS
SUPERVISED

PhD students as Chair

Paul Cummings, Zhaohan He, William Shumaker, Michael Vargas, Archis Joglekar.

Masters Students (Independent research projects)

John-Michael Fischer, Soren Taverniers, Blake Griffin.

Undergraduate Students

Alesha Ward, Maynard Leon, John Koglin, Spencer Jolly, Daniel Chudnow, Archis Joglekar, Matthew Weis, Lee Gunderson, Derek Lax, David Collins, Alison Christopher, Kirk Liberty, Charles Matrosic.

RESEARCH
GRANTS

As Principle Investigator

Title: Non-Linear Optics in Plasmas at Ultra-High Intensities

PI: Alec Thomas

Source: National Science Foundation

Award Period: 01/01/10-12/31/12

Award Amount: \$500,001

Support: 1 summer month

Title: CAREER: Bright femtosecond x - and γ -ray pulse production using ultra-intense lasers

PI: Alec Thomas

Source: National Science Foundation

Award Period: 10/1/2011-9/31/2016

Award Amount: \$450,000

Support: 1 summer month

Title: AFOSR Young Investigator Program: Understanding intense laser interactions with solid density plasma

PI: Alec Thomas

Source: Department of Defense, Air Force

Award Period: 10/1/2012-9/31/2017

Award Amount: \$373,603

Support: 1 summer month

As Co-Investigator

Title: Collaborative Research: Graduate Student Training Through Research on Plasma-Based Accelerators

PI: Chan Joshi (UCLA)

Source: National Science Foundation

Award Period: 9/01/09-8/31/14

Award Amount: \$374,497 (Michigan)

Support: 0 summer month

Title: Faculty Development Program at the University of Michigan

PI: William Martin

Source: Nuclear Regulatory Commission

Award Period: 07/17/2009-7/16/2012

Award Amount: \$599,506

Support: 1 summer month

Title: Investigation of Laser-Based Thomson Scattering

PI: John Nees

Source: DoD, Department of Defense, Army

Award Period: 03/05/2011-03/04/2012

Award Amount: \$120,000

Support: 0 summer month

Title: Generation of Miniature Hohlraum Xray Sources Using Intense Lasers
PI: Karl Krushelnick
Source: Department of Defense, Defense Threat Reduction Agency
Award Period: 01/01/2011-12/31/2015
Award Amount: \$1,768,803
Support: 1 summer month

Title: Compact Laser Plasma Source of Spatially Coherent X-rays
PI: Karl Krushelnick
Source: Defense, Department of-Defense Advanced Research Projects Agency
Award Period: 06/01/2011-05/31/2015
Award Amount: \$4,060,089
Support: 1 summer month

SYNERGISTIC
ACTIVITIES

Activities with the University

- Faculty Panelist, College of Engineering Junior Dinner (2012).
- Member of Undergraduate Program Committee (2012-Present)
- UROP program advisor (2011-Present).
- Judge, Michigan Institute for Plasma Science and Engineering Annual Graduate Student Symposium (2011).
- Member of the Nuclear Engineering and Radiological Sciences executive committee (2011-2014).
- Spring Commencement Marshall (2011).
- NERS Undergraduate student mentor (2010-Present).
- Member of Nuclear Engineering and Radiological Sciences qualifying exam ad-hoc committee.
- Member of the Center for Ultrafast Optical Science executive committee.
- Designed and implemented new Computational Plasma Physics course for Nuclear Engineering and Radiological Sciences.
- Founder and leader of [High Field Science Theory and Computation group](#).
- Judge, Michigan Institute for Plasma Science and Engineering Annual Graduate Student Symposium (2010).
- Judge, University of Michigan College of Engineering Cyber Infrastructure Poster Session (2010).
- Spring Commencement Marshall (2010).

Other Outreach activities

- Article on Nuclear Energy for Consider Magazine, a student magazine for a general readership (2009).
- Laser-plasma blog (2010-Present).

Other activities

- Elected Vice-Chair, High Energy Density Science Association (2011).
- Session Chair, "High intensity laser plasma interactions", American Physical Society Division of Plasma Physics Annual Meeting (2011).
- Organizing Committee/Working Group 1 Co-Chair, Laser and Plasma Accelerator Workshop (2011).
- Elected to Steering Committee (3 year tenure), High Energy Density Science Association (2010).
- Organizing Committee/Working Group 1 Co-Chair, Advanced Accelerator Concepts Workshop (2010).
- American Nuclear Society Student conference, judge and chair, *LASERs and Nuclear Engineering Research* session (2010).
- Session chair, CLEO (2006).

Referee services

- Reviewer for the General Secretariat for Research and Technology of Greece ARISTEIA program (2012).
- Reviewer, National Science Foundation Early Career Award (2011).
- Reviewer, Department of Energy Graduate Fellowship onsite panel, Washington (2010).
- Reviewer for U.S. Civilian Research & Development Foundation (2010).
- Reviewer for Air Force Office of Scientific Research (2010).
- Reviewer for the National Science Foundation/Department of Energy Partnerships in Plasma Science program (2010).
- Reviewer for the journals: IEEE Transactions on Plasma Science, Plasma Physics and Controlled Fusion, Physical Review Special Topics – Accelerators and Beams, Journal of Physics A, Journal of Physics B, Journal of Physics D, Journal of Plasma Physics, New Journal of Physics, and Physics of Plasmas.

PROFESSIONAL ASSOCIATIONS Associate Member; American Physical Society, European Physical Society, High Energy Density Science Association, American Nuclear Society, Institute of Physics (UK).

INVITED TALKS AND PAPERS Feb 2012, Invited review paper in Journal of Computational Physics – “A review of Vlasov-Fokker-Planck numerical modeling of inertial confinement fusion plasma”.
June 2011, LPAW, Shanghai (Wuzhen) China.
June 2010, CAP Congress, Toronto, Canada.
November 2009, APS DPP annual meeting, Atlanta GA.
June 2007, EPS DPP annual meeting, Warsaw, Poland.

CONTRIBUTED TALKS Full list available on request (> 40).

RECENT COLLABORATORS Imperial College London, UK; UCLA, USA; University of Texas, USA; Rutherford-Appleton Laboratory, UK; IST, Portugal; University of Jena, Germany; University of Alberta, Canada; Lund Laser Centre, Lund, Sweden.

* PEER REVIEWED JOURNAL ARTICLES AND CONFERENCE PROCEEDINGS

- [1] S. Kneip, C. McGuffey, J. L. Martins, M. S. Bloom, V. Chvykov, F. Dollar, R. Fonseca, S. Jolly, G. Kalintchenko, K. Krushelnick, A. Maksimchuk, S. P. D. Mangles, Z. Najmudin, C. A. J. Palmer, K. T. Phuoc, W. Schumaker, L. O. Silva, J. Vieira, V. Yanovsky, and **A. G. R. Thomas**, *Characterization of transverse beam emittance of electrons from a laser-plasma wakefield accelerator in the bubble regime using betatron x-ray radiation*, Phys. Rev. Spec. Top.-Accel. Beams **15** (2012).
- [2] **A. G. R. Thomas**, M. Tzoufras, A. P. L. Robinson, R. J. Kingham, C. P. Ridgers, M. Sherlock, and A. R. Bell, *A review of Vlasov-Fokker-Planck numerical modeling of inertial confinement fusion plasma*, J. Comput. Phys. **231**, 1051 (2012).
- [3] S. P. D. Mangles, G. Genoud, M. S. Bloom, M. Burza, Z. Najmudin, A. Persson, K. Svensson, **A. G. R. Thomas**, and C. G. Wahlstrom, *Self-injection threshold in self-guided laser wakefield accelerators*, Phys. Rev. Spec. Top.-Accel. Beams **15** (2012).
- [4] L. Willingale, **A. G. R. Thomas**, P. M. Nilson, M. C. Kaluza, S. Bandyopadhyay, A. E. Dangor, R. G. Evans, P. Fernandes, M. G. Haines, C. Kamperidis, R. J. Kingham, S. Minardi, M. Notley, C. P. Ridgers, W. Rozmus, M. Sherlock, M. Tatarakis, M. S. Wei, Z. Najmudin, and K. Krushelnick, *Proton probe measurement of fast advection of magnetic fields by hot electrons*, Plasma Phys. Control. Fusion **53** (2011).

- [5] L. Willingale, P. M. Nilson, **A. G. R. Thomas**, J. Cobble, R. S. Craxton, A. Maksimchuk, P. A. Norreys, T. C. Sangster, R. H. H. Scott, C. Stoeckl, C. Zulick, and K. Krushelnick, *Proton Probe Imaging of Fields Within a Laser-Generated Plasma Channel*, IEEE Trans. Plasma Sci. **39**, 2616 (2011).
- [6] S. Kneip, C. McGuffey, F. Dollar, M. S. Bloom, V. Chvykov, G. Kalintchenko, K. Krushelnick, A. Maksimchuk, S. P. D. Mangles, T. Matsuoka, Z. Najmudin, C. A. J. Palmer, J. Schreiber, W. Schumaker, **A. G. R. Thomas**, and V. Yanovsky, *X-ray phase contrast imaging of biological specimens with femtosecond pulses of betatron radiation from a compact laser plasma wakefield accelerator*, App. Phys. Lett. **99**, 093701 (2011).
- [7] F. Dollar, T. Matsuoka, G. M. Petrov, **A. G. R. Thomas**, S. S. Bulanov, V. Chvykov, J. Davis, G. Kalinchenko, C. McGuffey, L. Willingale, V. Yanovsky, A. Maksimchuk, and K. Krushelnick, *Control of Energy Spread and Dark Current in Proton and Ion Beams Generated in High-Contrast Laser Solid Interactions*, Phys. Rev. Lett. **107**, 065003 (2011).
- [8] L. Willingale, G. M. Petrov, A. Maksimchuk, J. Davis, R. R. Freeman, A. S. Joglekar, T. Matsuoka, C. D. Murphy, V. M. Ovchinnikov, **A. G. R. Thomas**, L. Van Woerkom, and K. Krushelnick, *Comparison of bulk and pitcher-catcher targets for laser-driven neutron production*, Phys. Plasmas **18**, 083106 (2011).
- [9] P. Cummings and **A. G. R. Thomas**, *A computational investigation of the impact of aberrated Gaussian laser pulses on electron beam properties in laser-wakefield acceleration experiments*, Phys. Plasmas **18**, 053110 (2011).
- [10] L. Willingale, P. M. Nilson, **A. G. R. Thomas**, S. S. Bulanov, A. Maksimchuk, W. Nazarov, T. C. Sangster, C. Stoeckl, and K. Krushelnick, *High-power, kilojoule laser interactions with near-critical density plasma*, Phys. Plasmas **18**, 056706 (2011), 52nd Annual Meeting of the APS Division of Plasma Physics, Chicago, IL, 2010.
- [11] B. Hou, J. A. Nees, Z. He, G. Petrov, J. Davis, J. H. Easter, **A. G. R. Thomas**, and K. M. Krushelnick, *Laser-ion acceleration through controlled surface contamination*, Phys. Plasmas **18**, 040702 (2011).
- [12] **A. G. R. Thomas**, *Response to "Comment on 'Scalings for radiation from plasma bubbles'"* [*Phys. Plasmas* **18**, 034701, (2011)], Phys. Plasmas **18**, 034702 (2011).
- [13] L. Willingale, P. M. Nilson, **A. G. R. Thomas**, J. Cobble, R. S. Craxton, A. Maksimchuk, P. A. Norreys, T. C. Sangster, R. H. H. Scott, C. Stoeckl, C. Zulick, and K. Krushelnick, *High-Power, Kilojoule Class Laser Channeling in Millimeter-Scale Underdense Plasma*, Phys. Rev. Lett. **106**, 105002 (2011).
- [14] C. M. Huntington, **A. G. R. Thomas**, C. McGuffey, T. Matsuoka, V. Chvykov, G. Kalintchenko, S. Kneip, Z. Najmudin, C. Palmer, V. Yanovsky, A. Maksimchuk, R. P. Drake, T. Katsouleas, and K. Krushelnick, *Current Filamentation Instability in Laser Wakefield Accelerators*, Phys. Rev. Lett. **106**, 105001 (2011).
- [15] C. G. R. Geddes, C. Clayton, W. Lu, and **A. G. R. Thomas**, *Summary Report of Working Group 1: Laser-Plasma Acceleration*, Vol. 1299 by *AIP Conference Proceedings*, pg. 79–87 (2010), 14th Workshop on Advanced Accelerator Concepts, Annapolis, MD, JUN 13-19, 2010.
- [16] C. McGuffey, W. Schumaker, S. Kneip, T. Matsuoka, V. Y. Bychenkov, I. V. Glazyrin, A. V. Karpeev, F. J. Dollar, V. Chvykov, G. Kalintchenko, V. Yanovsky, **A. G. R. Thomas**, A. Maksimchuk, and K. Krushelnick, *Effects of Ionization in a Laser Wakefield Accelerator*, Vol. 1299 by *AIP Conference Proceedings*, pg. 144–149 (2010), 14th Workshop on Advanced Accelerator Concepts, Annapolis, MD, JUN 13-19, 2010.
- [17] P. Dong, S. A. Reed, S. A. Yi, S. Kalmykov, G. Shvets, N. H. Matlis, C. McGuffey, S. S. Bulanov, V. Chvykov, G. Kalintchenko, K. Krushelnick, A. Maksimchuk, T. Matsuoka, **A. G. R. Thomas**, V. Yanovsky, and M. C. Downer, *Formation of Optical Bullets in Laser-Driven Plasma Bubble Accelerators*, Vol. 1299 by *AIP Conference Proceedings*, pg. 171–173 (2010), 14th Workshop on Advanced Accelerator Concepts, Annapolis, MD, JUN 13-19, 2010.
- [18] S. Kneip, C. McGuffey, V. Chvykov, F. Dollar, G. Kalintchenko, T. Maksimchuk, S. P. D. Mangles, T. Matsuoka, S. R. Nagel, C. A. J. Palmer, J. Schreiber, K. T. Phuoc, **A. G. R. Thomas**, K. Krushelnick, and Z. Najmudin, *Synchrotron Radiation from a Laser Plasma Accelerator in the Bubble Regime*, Vol. 1299 by *AIP Conference Proceedings*, pg. 185–190 (2010), 14th Workshop on Advanced Accelerator Concepts, Annapolis, MD, JUN 13-19, 2010.

- [19] F. Dollar, T. Matsuoka, C. McGuffey, S. S. Bulanov, V. Chvykov, J. Davis, G. Kalintchenko, G. Petrov, **A. G. R. Thomas**, L. Willingale, V. Yanovsky, A. Maksimchuk, and K. Krushelnick, *Narrow Energy Spread Protons and Ions from High-Intensity, High-Contrast Laser Solid Target Interactions*, Vol. 1299 by *AIP Conference Proceedings*, pg. 710–714 (2010), 14th Workshop on Advanced Accelerator Concepts, Annapolis, MD, JUN 13-19, 2010.
- [20] T. Matsuoka, S. Kneip, C. McGuffey, C. Palmer, J. Schreiber, C. Huntington, Y. Horovitz, F. Dollar, V. Chvykov, G. Kalintchenko, **A. G. R. Thomas**, V. Yanovsky, K. T. Phuoc, S. P. D. Mangles, Z. Najmudin, A. Maksimchuk, and K. Krushelnick, *Synchrotron x-ray radiation from laser wakefield accelerated electron beams in a plasma channel*, Vol. 244 by *Journal of Physics Conference Series*, page. 042026 (2010), 6th International Conference on Inertial Fusion Sciences and Applications, San Francisco, CA, SEP 06-11, 2009.
- [21] S. S. Bulanov, T. Z. Esirkepov, **A. G. R. Thomas**, J. K. Koga, and S. V. Bulanov, *Schwinger Limit Attainability with Extreme Power Lasers*, *Phys. Rev. Lett.* **105**, 220407 (2010).
- [22] S. Kneip, C. McGuffey, J. L. Martins, S. F. Martins, C. Bellei, V. Chvykov, F. Dollar, R. Fonseca, C. Huntington, G. Kalintchenko, A. Maksimchuk, S. P. D. Mangles, T. Matsuoka, S. R. Nagel, C. A. J. Palmer, J. Schreiber, K. T. Phuoc, **A. G. R. Thomas**, V. Yanovsky, L. O. Silva, K. Krushelnick, and Z. Najmudin, *Bright spatially coherent synchrotron X-rays from a tabletop source*, *Nature Phys.* **6**, 980 (2010).
- [23] J. H. Easter, A. G. Mordovanakis, B. Hou, **A. G. R. Thomas**, J. A. Nees, G. Mourou, and K. Krushelnick, *High-order harmonic generation from solid targets with 2 mJ pulses*, *Optics Lett.* **35**, 3186 (2010).
- [24] P. Dong, S. A. Reed, S. A. Yi, S. Y. Kalmykov, G. Shvets, M. C. Downer, N. H. Matlis, W. P. Leemans, C. McGuffey, S. S. Bulanov, V. Chvykov, G. Kalintchenko, K. Krushelnick, A. Maksimchuk, T. Matsuoka, **A. G. R. Thomas**, and V. Yanovsky, *Visualization of plasma bubble accelerators using Frequency-Domain Shadowgraphy*, *High Energy Density Physics* **6**, 153 (2010), 2nd International Conference on High Energy Density Physics, Austin, TX, MAY 19-22, 2009.
- [25] M. C. Kaluza, H.-P. Schlenvoigt, S. P. D. Mangles, **A. G. R. Thomas**, H. Dangor, A. E. Schworer, W. B. Mori, Z. Najmudin, and K. K., *Measurement of magnetic-field structures in a laser-wakefield accelerator*, *Phys. Rev. Lett.* **105**, 115002 (2010).
- [26] M. C. Kaluza, S. P. D. Mangles, **A. G. R. Thomas**, Z. Najmudin, A. E. Dangor, C. D. Murphy, J. L. Collier, E. J. Divall, P. S. Foster, C. J. Hooker, A. J. Langley, J. Smith, and K. K., *Observation of a long-wavelength hosing modulation of a high-intensity laser pulse in underdense plasma*, *Phys. Rev. Lett.* **105**, 095003 (2010).
- [27] L. Willingale, **A. G. R. Thomas**, P. M. Nilson, M. C. Kaluza, S. Bandyopadhyay, A. E. Dangor, R. G. Evans, P. Fernandes, M. G. Haines, C. Kamperidis, R. J. Kingham, S. Minardi, M. Notley, C. P. Ridgers, W. Rozmus, M. Sherlock, M. Tatarakis, M. S. Wei, Z. Najmudin, and K. Krushelnick, *Fast advection of magnetic fields by hot electrons*, *Phys. Rev. Lett.* **105**, 095001 (2010).
- [28] T. Matsuoka, C. McGuffey, P. G. Cummings, Y. Horovitz, F. Dollar, V. Chvykov, G. Kalintchenko, P. Rousseau, V. Yanovsky, S. S. Bulanov, **A. G. R. Thomas**, A. Maksimchuk, and K. Krushelnick, *Stimulated Raman Side Scattering in Laser Wakefield Acceleration*, *Phys. Rev. Lett.* **105**, 034801 (2010).
- [29] P. M. Nilson, S. P. D. Mangles, L. Willingale, M. C. Kaluza, **A. G. R. Thomas**, M. Tatarakis, R. J. Clarke, K. L. Lancaster, S. Karsch, J. Schreiber, Z. Najmudin, A. E. Dangor, and K. Krushelnick, *Plasma cavitation in ultraintense laser interactions with underdense helium plasmas*, *New J. Phys.* **12**, 045014 (2010).
- [30] P. Dong, S. A. Reed, S. A. Yi, S. Kalmykov, Z. Y. Li, G. Shvets, N. H. Matlis, C. McGuffey, S. S. Bulanov, V. Chvykov, G. Kalintchenko, K. Krushelnick, A. Maksimchuk, T. Matsuoka, **A. G. R. Thomas**, V. Yanovsky, and M. C. Downer, *Holographic visualization of laser wakefields*, *New J. Phys.* **12**, 045016 (2010).
- [31] L. Willingale, P. M. Nilson, M. C. Kaluza, A. E. Dangor, R. G. Evans, P. Fernandes, M. G. Haines, C. Kamperidis, R. J. Kingham, C. P. Ridgers, M. Sherlock, **A. G. R. Thomas**, M. S. Wei, Z. Najmudin, K. Krushelnick, S. Bandyopadhyay, M. Notley, S. Minardi, M. Tatarakis, and W. Rozmus, *Proton deflectometry of a magnetic reconnection geometry*, *Phys. Plasmas* **17**, 043104 (2010).

- [32] S. S. Bulanov, V. Y. Bychenkov, V. Chvykov, G. Kalinchenko, D. W. Litzenberg, T. Matsuoka, **A. G. R. Thomas**, L. Willingale, V. Yanovsky, K. Krushelnick, and A. Maksimchuk, *Generation of GeV protons from 1 PW laser interaction with near critical density targets*, Phys. Plasmas **17**, 043105 (2010).
- [33] **A. G. R. Thomas**, *Scalings for radiation from plasma bubbles*, Phys. Plasmas **17**, 056708 (2010).
- [34] P. Dong, S. A. Reed, S. A. Yi, S. Kalmykov, G. Shvets, M. C. Downer, N. H. Matlis, W. P. Leemans, C. McGuffey, S. S. Bulanov, V. Chvykov, G. Kalintchenko, K. Krushelnick, A. Maksimchuk, T. Matsuoka, **A. G. R. Thomas**, and V. Yanovsky, *Formation of Optical Bullets in Laser-Driven Plasma Bubble Accelerators*, Phys. Rev. Lett. **104**, 134801 (2010).
- [35] **A. G. R. Thomas**, *Algorithm for calculating spectral intensity due to charged particles in arbitrary motion*, Phys. Rev. ST Accel. Beams **13**, 020702 (2010).
- [36] C. McGuffey, **A. G. R. Thomas**, W. Schumaker, T. Matsuoka, V. Chvykov, F. J. Dollar, G. Kalintchenko, V. Yanovsky, A. Maksimchuk, K. Krushelnick, V. Y. Bychenkov, I. V. Glazyrin, and A. V. Karpeev, *Ionization Induced Trapping in a Laser Wakefield Accelerator*, Phys. Rev. Lett. **104**, 025004 (2010).
- [37] P. M. Nilson, S. P. D. Mangles, L. Willingale, M. C. Kaluza, **A. G. R. Thomas**, M. Tatarakis, Z. Najmudin, R. J. Clarke, K. L. Lancaster, S. Karsch, J. Schreiber, R. G. Evans, A. E. Dangor, and K. Krushelnick, *Generation of Ultrahigh-Velocity Ionizing Shocks with Petawatt-Class Laser Pulses*, Phys. Rev. Lett. **103**, 255001 (2009).
- [38] **A. G. R. Thomas** and K. Krushelnick, *Betatron x-ray generation from electrons accelerated in a plasma cavity in the presence of laser fields*, Phys. Plasmas **16**, 103103 (2009).
- [39] B. Hou, J. Nees, J. Easter, J. Davis, G. Petrov, **A. Thomas**, and K. Krushelnick, *MeV proton beams generated by 3 mJ ultrafast laser pulses at 0.5 kHz*, Appl. Phys. Lett. **95**, 101503 (2009).
- [40] L. Willingale, S. R. Nagel, **A. G. R. Thomas**, C. Bellei, R. J. Clarke, A. E. Dangor, R. Heathcote, M. C. Kaluza, C. Kamperidis, S. Kneip, K. Krushelnick, N. Lopes, S. P. D. Mangles, W. Nazarov, P. M. Nilson, and Z. Najmudin, *Characterization of High-Intensity Laser Propagation in the Relativistic Transparent Regime through Measurements of Energetic Proton Beams*, Phys. Rev. Lett. **102**, 125002 (2009).
- [41] **A. G. R. Thomas**, R. J. Kingham, and C. P. Ridgers, *Rapid self-magnetization of laser speckles in plasmas by nonlinear anisotropic instability*, New J. Phys. **11**, 033001 (2009).
- [42] R. M. G. M. Trines, C. D. Murphy, K. L. Lancaster, O. Chekhlov, P. A. Norreys, R. Bingham, J. T. Mendonca, L. O. Silva, S. P. D. Mangles, C. Kamperidis, **A. Thomas**, K. Krushelnick, and Z. Najmudin, *Photon acceleration and modulational instability during wakefield excitation using long laser pulses*, Plas. Phys. Controlled Fusion **51**, 024008 (2009).
- [43] **A. G. R. Thomas**, S. P. D. Mangles, C. D. Murphy, A. E. Dangor, P. S. Foster, J. G. Gallacher, D. A. Jaroszynski, C. Kamperidis, K. Krushelnick, K. L. Lancaster, P. A. Norreys, R. Viskup, and Z. Najmudin, *Ultrashort pulse filamentation and monoenergetic electron beam production in LWFA's*, Plas. Phys. Controlled Fusion **51**, 024010 (2009).
- [44] C. P. Ridgers, **A. G. R. Thomas**, R. J. Kingham, and A. P. L. Robinson, *Transport in the presence of inverse bremsstrahlung heating and magnetic fields*, Phys. Plas. **15**, 092311 (2008).
- [45] F. Lindau, O. Lundh, S. P. D. Mangles, M. C. Kaluza, K. Krushelnick, Z. Najmudin, A. Persson, **A. G. R. Thomas**, and C.-G. Wahlstrom, *Characterization of quasi-monoenergetic electron beams at the lund laser centre*, IEEE Trans. Plas. Sci. **36**, 1707 (2008).
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