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Po-Yu Chang

Education

- Ph.D.,** Department of Physics, University of Rochester, Rochester, NY 2006-2013
Thesis Advisor: Dr. R. Betti (University of Rochester)
Thesis title: Laser-Driven Magnetic-Flux Compression: Theory and Experiments
- M.A.,** Department of Physics, University of Rochester, Rochester, NY 2008
- M.S.,** Institute of Electro-Optical Engineering, National Chiao Tung University, Hsinchu, Taiwan 2004
Thesis Advisor: Dr. Ken Y. Hsu (National Chiao Tung University)
Thesis title: Fabrication of PQ:PMMA Photopolymer Disk and Research on the Properties of Holographic Storage
- B.S.,** Department of Electrical Engineering, National Cheng Kung University, Tainan, Taiwan 2002
Second Major: Department of Physics / NCKU rugby team

Professional Experience

- Assistant Professor**
Institute of Space and Plasma Sciences, National Cheng Kung University, Tainan, Taiwan 2016-present
- Postdoctoral Associate**
Department of Mechanical Engineering, Fusion Science Center for Extreme States of Matter, Laboratory for Laser Energetics, University of Rochester, Rochester, NY 2013-2016
- Teaching Assistant**
Department of Physics and Astronomy, University of Rochester, Rochester, NY 2006-2007
- Software Designer**
Integrated Crystal Technology Incorporation, Hsinchu, Taiwan 2005-2006
- Contracted Tutor**
General physics laboratory, National Chiao Tung University, Hsinchu, Taiwan 2004-2006

2022/3/3 Updated

Honors and Awards

- Award:** Distinction award of Innovative research and development results by young scholars in Taiwan comprehensive university system in 2020
109年台灣綜合大學系統年輕學者創新研發成果選拔數理組傑出獎
Title: Development of the EUV light source using discharge-produced plasma
- Award:** Excellent teacher in 2019
108 學年度教學優良教師
- Award:** Best Poster Award in the annual meeting of Aeronautics and Astronautics Program, Taiwan Nov 2019
108年度航太學門成果發表會最佳海報獎第一名
Title: Development of a metallic ion thruster using magnetron e-beam bombardments
- Award:** Project for Excellent Junior Research Investigators 2018-2020
Title: Development of a metallic ion thruster using magnetron e-beam bombardments
- Recipient** Frank J. Horton Research Fellowships, Laboratory of Laser Energetics, University of Rochester, Rochester, NY 2007-2012
- Award:** Best Student Paper Award of Optics and Photonics Taiwan '03 conference Dec 2003
Title: Holographic data storage on a photopolymer disk

Professional Associations

- Member** American Physical Society, 2008-present
The Physical Society of Taiwan, 2017-present

Scientific indices

- Total Citation** 1263
H-index 20

Publications

- [1] *One-kilojoule Pulsed-Power Generator for Laboratory Space Sciences*
Po-Yu Chang*, Yen-Cheng Lin, Ming-Hsiang Kuo, Cheng-Han Du, Chih-Jui Hsieh, Mei-Feng Huang, Ming-Cheng Jheng, Jia-Kai Liu, Sheng-Hua Yang, I-Lin Yeh, and Frank J. Wessel
Review of Scientific Instruments, Accepted (2022/3)
- [2] *Characterizing laser preheat for laser-driven magnetized liner inertial fusion using soft x-ray emission*
D. H. Barnak, M. J. Bonino, P.-Y. Chang, J. R. Davies, E. C. Hansen, D. R. Harding, J. L. Peebles, and R. Betti
Physics of Plasmas 27, 112709 (2020)
<https://doi.org/10.1063/5.0014955>
- [3] *Rail-gap switch with a multistep high-voltage triggering system*
Po-Yu Chang*, Chih-Jui Hsieh, Mei-Feng Huang, Ming-Cheng Jheng, Yen-Cheng Lin, Jia-Kai Liu, and Sheng-Hua Yang
Review of Scientific Instruments 91, 114703 (2020)
<https://doi.org/10.1063/5.0015104>
- [4] *Metal ion thruster using magnetron electron-beam bombardment (MIT-MEB)*
Kuo-Yi Chen¹, Po-Yu Chang* and Wan-Yi Lin
Plasma Sources Science and Technology 29, 065021 (2020)
<https://doi.org/10.1088/1361-6595/ab6361>
- [5] *Plasma Behavior in a Solid-Fed Pulsed Plasma Thruster*
Yueh-Heng Li, Sunil Palagiri, Po-Yu Chang, Christoph Montag, Georg Herdrich
Journal of Aeronautics, Astronautics and Aviation, 51, 31 (2019)
[http://dx.doi.org/10.6125/JoAAA.201903_51\(1\).03](http://dx.doi.org/10.6125/JoAAA.201903_51(1).03)
- [6] *Optimization of laser-driven cylindrical implosions on the OMEGA laser*
E. C. Hansen, D. H. Barnak, P.-Y. Chang, R. Betti, E. M. Campbell, J. R. Davies, J. P. Knauer, J. L. Peebles, S. P. Regan, and A. B. Sefkow
Physics of Plasmas 25, 122701 (2018)
<https://doi.org/10.1063/1.5055776>
- [7] *Inductively coupled 30 T magnetic field platform for magnetized high-energy-density plasma studies*
G. Fiksel, R. Backhus, D. H. Barnak, P.-Y. Chang, J. R. Davies, D. Jacobs-Perkins, P. McNally, R. B. Spielman, E. Vigas, and R. Betti

Review of Scientific Instruments 89, 084703 (2018)
<https://doi.org/10.1063/1.5040756>

[8] *Laser entrance window transmission and reflection measurements for preheating in magnetized liner inertial fusion*

J. R. Davies, R. E. Bahr, D. H. Barnak, R. Betti, M. J. Bonino, E. M. Campbell, E. C. Hansen, D. R. Harding, J. L. Peebles, A. B. Sefkow, W. Seka, P.-Y. Chang, M. Geissel, and A. J. Harvey-Thompson

Physics of Plasmas 25, 062704 (2018)
<https://doi.org/10.1063/1.5030107>

[9] *Effects of residual kinetic energy on yield degradation and ion temperature asymmetries in inertial confinement fusion implosions*

K. M. Woo, R. Betti, D. Shvarts, A. Bose, D. Patel, R. Yan, P.-Y. Chang, O. M. Mannion, R. Epstein, J. A. Delettrez, M. Charissis, K. S. Anderson, P. B. Radha, A. Shvydky, I. V. Igumenshchev, V. Gopalaswamy, A. R. Christopherson, J. Sanz, and H. Aluie

Physics of Plasmas 25, 052704 (2018)
<https://doi.org/10.1063/1.5026706>

[10] *Increasing the magnetic-field capability of the magneto-inertial fusion electrical discharge system using an inductively coupled coil*

D. H. Barnak, J. R. Davies, G. Fiksel, P.-Y. Chang, E. Zabir, and R. Betti

Review of Scientific Instruments 89, 033501 (2018)
<https://doi.org/10.1063/1.5012531>

[11] *Laser-driven magnetized liner inertial fusion*

J. R. Davies, D. H. Barnak, R. Betti, E. M. Campbell, P.-Y. Chang, A. B. Sefkow, K. J. Peterson, D. B. Sinars, and M. R. Weis

Physics of Plasmas 24, 062701 (2017)
<https://doi.org/10.1063/1.4984779>

[12] *Laser-driven magnetized liner inertial fusion on OMEGA*

D. H. Barnak, J. R. Davies, R. Betti, M. J. Bonino, E. M. Campbell, V. Yu. Glebov, D. R. Harding, J. P. Knauer, S. P. Regan, A. B. Sefkow, A. J. Harvey-Thompson, K. J. Peterson, D. B. Sinars, S. A. Slutz, M. R. Weis, and P.-Y. Chang

Physics of Plasmas 24, 056310 (2017)
<https://doi.org/10.1063/1.4982692>

[13] *Diagnosing laser-preheated magnetized plasmas relevant to magnetized liner inertial fusion*

A. J. Harvey-Thompson, A. B. Sefkow, T. N. Nagayama, M. S. Wei, E. M. Campbell, G. Fiksel, P.-Y. Chang, J. R. Davies, D. H. Barnak, V. Y.

Glebov, P. Fitzsimmons, J. Fooks and B. E. Blue

Physics of Plasmas **22**, 122708 (2015)
<http://dx.doi.org/10.1063/1.4938047>

[14] *The importance of electrothermal terms in Ohm's law for magnetized spherical implosions*

J. R. Davies, R. Betti, P.-Y. Chang, and G. Fiksel

Physics of Plasmas **22**, 112703 (2015)
<http://dx.doi.org/10.1063/1.4935286>

[15] *Use of external magnetic fields in hohlraum plasmas to improve laser-coupling*

D. S. Montgomery, B. J. Albright, D. H. Barnak, P. Y. Chang, J. R. Davies, G. Fiksel, D. H. Froula, J. L. Kline, M. J. MacDonald, A. B. Sefkow, L. Yin, and R. Betti

Physics of Plasmas **22**, 01703 (2015)
<https://doi.org/10.1063/1.4906055>

[16] *Note: Experimental Platform for Magnetized High-Energy-Density Plasma Studies at the Omega Laser Facility*

G. Fiksel, A. Agliata, D. H. Barnak, G. Brent, P.-Y. Chang, L. Folsbee, G. Gates, D. Hasset, D. Lonobile, J. Magoon, D. Mastrosimone, M.J. Shoup III, and R. Betti

Review of Scientific Instruments **86**, 016105 (2015)
<http://dx.doi.org/10.1063/1.4905625>

[17] *Magnetic Reconnection between Colliding Magnetized Laser-Produced Plasma Plumes*

G. Fiksel, W. Fox, A. Bhattacharjee, D.H. Barnak, P.-Y. Chang, K. Germaschewski, S. X. Hu, and P.M. Nilson

Physical Review Letters **113**, 105003 (2014)
<http://link.aps.org/doi/10.1103/PhysRevLett.113.105003>

[18] *Magnetic collimation of relativistic positrons and electrons from high intensity laser-matter interactions*

Hui Chen, G. Fiksel, D. Barnak, P.-Y. Chang, R. F. Heeter, A. Link, and D. D. Meyerhofer

Physics of Plasmas **21**, 040703 (2014)
<http://dx.doi.org/10.1063/1.4873711>

[19] *Filamentation Instability of Counterstreaming Laser-Driven Plasmas*

W. Fox, G. Fiksel, A. Bhattacharjee, P.-Y. Chang, K. Germaschewski, S. X. Hu, and P. M. Nilson

Physical Review Letters **111**, 225002 (2013)
<http://link.aps.org/doi/10.1103/PhysRevLett.111.225002>

- [20] *Visualizing electromagnetic fields in laser-produced counter-streaming plasma experiments for collisionless shock laboratory astrophysics*
- N. L. Kugland, J. S. Ross, P.-Y. Chang, R. P. Drake, G. Fiksel, D. H. Froula, S. H. Glenzer, G. Gregori, M. Grosskopf, C. Huntington, M. Koenig, Y. Kuramitsu, C. Kuranz, M. C. Levy, E. Liang, D. Martinez, J. Meinecke, F. Miniati, T. Morita, A. Pelka, C. Plechaty, R. Presura, A. Ravasio, B. A. Remington, B. Reville, D. D. Ryutov, Y. Sakawa, A. Spitkovsky, H. Takabe and H.-S. Park
- Physics of Plasmas 20, 056313 (2013)
<http://dx.doi.org/10.1063/1.4804548>
- [21] *Self-organized electromagnetic field structures in laser-produced counter-streaming plasmas*
- N. L. Kugland, D. D. Ryutov, P.-Y. Chang, R. P. Drake, G. Fiksel, D. H. Froula, S. H. Glenzer, G. Gregori, M. Grosskopf, M. Koenig, Y. Kuramitsu, C. Kuranz, M. C. Levy, E. Liang, J. Meinecke, F. Miniati, T. Morita, A. Pelka, C. Plechaty, R. Presura, A. Ravasio, B. A. Remington, B. Reville, J. S. Ross, Y. Sakawa, A. Spitkovsky, H. Takabe and H.-S. Park.
- Nature Physics 8, 809 (2012)
<http://dx.doi.org/10.1038/NPHYS2434>
- [22] *Inertial confinement fusion implosions with imposed magnetic field compression using the OMEGA Laser*
- M. Hohenberger, P.-Y. Chang, G. Fiksel, J. P. Knauer, R. Betti, F. J. Marshall, D. D. Meyerhofer, F. H. Seguin and R. D. Petrasso
- Physics of Plasmas 19, 056306 (2012)
<http://dx.doi.org/10.1063/1.3696032>
- [23] *Saturation of the Two-Plasmon Decay Instability in Long-Scale-Length Plasmas Relevant to Direct-Drive Inertial Confinement Fusion*
- D. H. Froula, B. Yaakobi, S. X. Hu, P.-Y. Chang, R. S. Craxton, D. H. Edgell, R. Follett, D. T. Michel, J. F. Myatt, W. Seka, R. W. Short, A. Solodov and C. Stoeckl
- Physical Review Letters 108, 165003 (2012)
<http://link.aps.org/doi/10.1103/PhysRevLett.108.165003>
- [24] *Fast-electron generation in long-scale-length plasmas*
- B. Yaakobi, P.-Y. Chang, A. Solodov, C. Stoeckl, D. H. Edgell, R. S. Craxton, S. X. Hu, J. F. Myatt, F. J. Marshall, W. Seka, D. H. Froula
- Physics of Plasmas 19, 012704 (2012)
<http://dx.doi.org/10.1063/1.3676153>
- [25] *Fusion Yield Enhancement in Magnetized Laser-Driven Implosions*
- P. Y. Chang, G. Fiksel, M. Hohenberger, J. P. Knauer, R. Betti, F. J. Marshall, D. D. Meyerhofer, F. H. Seguin and R. D. Petrasso

Physical Review Letters 107, 035006 (2011)
<http://link.aps.org/doi/10.1103/PhysRevLett.107.035006>

[26] *Generalized Measurable Ignition Criterion for Inertial Confinement Fusion*

PY. Chang, R. Betti, B. K. Spears, K. S. Anderson, J. Edwards, M. Fatenejad, J. D. Lindl, R. L. McCrory, R. Nora and D. Shvarts

Physical Review Letters 104, 135002 (2010)
<http://link.aps.org/doi/10.1103/PhysRevLett.104.135002>

[27] *Compressing magnetic fields with high-energy lasers*

J. P. Knauer, O. V. Gotchev, P. Y. Chang, D. D. Meyerhofer, O. Polomarov, R. Betti, J. A. Frenje, C. K. Li, M. J. -E. Manuel, R. D. Petrasso, J. R. Rygg and F. H. Seguin

Physics of Plasmas 17, 056318 (2010)
<http://dx.doi.org/10.1063/1.3416557>

[28] *Thermonuclear ignition in inertial confinement fusion and comparison with magnetic confinement*

R. Betti, P. Y. Chang, B. K. Spears, K. S. Anderson, J. Edwards, M. Fatenejad, J. D. Lindl, R. L. McCrory, R. Nora and D. Shvarts

Physics of Plasmas 17, 058102 (2010)
<http://dx.doi.org/10.1063/1.3380857>

[29] *Laser-Driven Magnetic-Flux Compression in High-Energy-Density Plasmas*

O. V. Gotchev, P. Y. Chang, J. P. Knauer, D. D. Meyerhofer, O. Polomarov, J. Frenje, C. K. Li, M. J. -E. Manuel, R. D. Petrasso, J. R. Rygg, F. H. Seguin and R. Betti

Physical Review Letters 103, 215004 (2009)
<http://link.aps.org/doi/10.1103/PhysRevLett.103.215004>

[30] *Seeding magnetic fields for laser-driven flux compression in high-energy-density plasmas*

O. V. Gotchev, J. P. Knauer, P. Y. Chang, N. W. Jang, M. J. Shoup III, D. D. Meyerhofer and R. Betti

Review of Scientific Instruments 80, 043504 (2009)
<http://dx.doi.org/10.1063/1.3115983>

Published proceedings (Invited)

- [1] *Plasma jet generated by a conical wire array driven by a 1-kJ pulsed power system* (Kenote speech)

Po-Yu Chang, Yen-Cheng Lin, Ming-Hsiang Kuo, Cheng-Han Du, Chih-Jui Hsieh, Mei-Feng Huang, Ming-Cheng Jheng, Jia-Kai Liu, Sheng-Hua Yang, I-Lin Yeh

Asia-Pacific International Symposium on the Basics and Applications of Plasma Technology, Taipei, Taiwan (December 2021)
<https://www.apspt12.org/index.html>

- [2] *From Industry to Space - Metallic Ion Thrusters* (Kenote speech)

Po-Yu Chang, Kuo-Yi Chen, Po-Wei Lai, Wan-Yi Lin

Asia-Pacific International Symposium on the Basics and Applications of Plasma Technology, Kanazawa, Japan (December 2019)
<http://apspt11.w3.kanazawa-u.ac.jp/>

Published proceedings (Contributed)

- [1] *The study of the rotational plasma jets produced by twisted-conical-wire array*

Yen-Cheng Lin, Chih-Jui Hsieh, Mei-Feng Huang, Ming-Cheng Jheng, Jia-Kai Liu, Sheng-Hua Yang, I-Lin Yeh, Po-Yu Chang

47th IEEE International conference on plasma sciences, Virtual Meeting (December 2020)
<https://ppt.cc/fsrMgx>

- [2] *Plasma jets generated from conical-wire arrays driven by a 1-kJ pulsed-power system*

Po-Yu Chang, Ming-Cheng Jheng, Chih-Jui Hsieh, Mei-Feng Huang, Po-Wei Lai, Yen-Cheng Lin, Jia-Kai Liu, Sheng-Hua Yang, I-Lin Yeh

62th Annual Meeting of the APS Division of Plasma Physics, Virtual Meeting (November 2020)
<https://meetings.aps.org/Meeting/DPP20/Session/VO06.14>

- [3] *Plasma jets generated by a 1-kJ pulsed-power system*

Po-Yu Chang, Ming-Cheng Jheng, Chih-Jui Hsieh, Mei-Feng Huang, Sheng-Hua Yang, I-Lin Yeh

61th Annual Meeting of the APS Division of Plasma Physics, Fort Lauderdale, FL, USA (October 2019)
<https://meetings.aps.org/Meeting/DPP19/Session/JP10.110>

- [4] *Metallic Ion Thruster using Magnetron E-Beam bombardment*

K.-Y. Chen, W.-Y. Lin, P.-Y. Chang

International Electric Propulsion Conference, Vienna, Austria (September

2019)
<https://iepc2019.smart-abstract.com/sessionplanner/#/persons/108886>

- [5] *Metallic Vapor Thruster using Field-emitted Electron Bombardments*
Po-Yu Chang, Kuo-Yi Chen, and Wan-Yi Lin
International Electric Propulsion Conference, Vienna, Austria (September 2019)
<https://iepc2019.smart-abstract.com/sessionplanner/#/persons/109655>
- [6] *An university-scale pulsed-power system using a parallel plate capacitor bank*
Po-Yu Chang, Ming-Cheng Jheng, Chih-Ruei Hieh, Mei-Feng Huang, Sheng-Hua Yang
60th Annual Meeting of the APS Division of Plasma Physics, Portland, OR, USA (October 2018)
<https://meetings.aps.org/Meeting/DPP18/Session/UP11.122>
- [7] *An university-scale pulsed-power system using a bipolar Marx generator*
Po-Yu Chang, Sheng-Hung Yang, and Mei-Feng Huang
59th Annual Meeting of the APS Division of Plasma Physics, Milwaukee, WI, USA (October 2017)
<https://meetings.aps.org/Meeting/DPP17/Session/CP11.29>
- [8] *Development of a university-scale pulsed-power system*
Po-Yu Chang, Mei-Feng Huang, Sheng-Hua Yang
International Conference on Dense Z Pinches, Lake Tahoe, Nevada, USA (August 2017)
- [9] *University-scale pulsed-power system using linear transformer driver*
Po-Yu Chang, Mei-Feng Huang, Tzong Huan Iang, Yi-Liang Tsai
58th Annual Meeting of the APS Division of Plasma Physics, San Jose, CA, USA (November 2016)
<http://meetings.aps.org/Meeting/DPP16/Session/NP10.123>
- [10] *First Results from Laser-Driven MagLIF Experiments on OMEGA: Optimization of Illumination Uniformity*
P.-Y. Chang, D.H. Barnak, R. Betti, J. R. Davies, G. Fiksel
57th Annual Meeting of the APS Division of Plasma Physics, Savannah, GA, USA (November 2015)
<http://meetings.aps.org/Meeting/DPP15/Session/JO6.11>
- [11] *Design of Scaled Magnetized Liner Inertial Fusion Experiments on OMEGA*
P.-Y. Chang, J. R. Davies, D. H. Barnak, G. Fiksel, R. Betti, and A.

Harvey-Thompson, and D. Sinars

56th Annual Meeting of the APS Division of Plasma Physics, New Orleans, LA, USA (October 2014)

<http://meeting.aps.org/Meeting/DPP14/Session/GO4.10>

[12] *Magnetized High-Energy-Density-Physics Platform on OMEGA*

P.-Y. Chang, A. Agliata, D. H. Barnak, R. Betti, G. Fiksel, D. Hasset, D. J. Lonobile, J. Magoon, M. J. Shoup III, and C. S. Taylor

20th Topical Conference on High-Temperature Plasma Diagnostics, Atlanta, GA, USA (June 2014)

<http://web.ornl.gov/sci/fed/HTPD2014/index.html>

[13] *Neutron Yield Enhancement by Magnetizing Implosions on OMEGA*

P.-Y. Chang, G. Fiksel, D. H. Barnak, J. R. Davies, and R. Betti

55th Annual Meeting of the APS Division of Plasma Physics, Denver, CO, USA (November 2013)

<http://meetings.aps.org/Meeting/DPP13/Session/BO7.10>

[14] *Experimental Platform for Magnetized HEDP Science at the Omega Laser Facility*

P.-Y. Chang, D. H. Barnak, M. Hohenberger, R. Betti, A. Agilata, W. Bittle, G. Fiksel, D. Hasset, D. Lonobile, M. J. Shoup III, and C. Taylor

54th Annual Meeting of the APS Division of Plasma Physics, Providence, RI, USA (October 2012)

<http://meeting.aps.org/Meeting/DPP12/Session/GP8.73>

[15] *Experiments and Simulations of Laser-Driven Magnetized ICF Targets on OMEGA*

P.-Y. Chang, G. Fiksel, M. Hohenberger, J. R. Davies, J. P. Knauer, R. Betti, F. H. S'eguin, and R. D. Petrasso

53rd Annual Meeting of the APS Division of Plasma Physics, Salt Lake City, UT, USA (November 2011)

<http://meeting.aps.org/Meeting/DPP11/Session/UO8.7>

[16] *Magnetized Spherical Implosions on the OMEGA Laser*

P. Chang, K. Anderson and R. Betti

52nd Annual Meeting of the APS Division of Plasma Physics, Chicago, IL, USA (November 2010)

<http://meetings.aps.org/Meeting/DPP10/Session/JO5.2>

[17] *A Measurable Three-Dimensional Ignition Criterion for Inertial Confinement Fusion*

P. Chang, K. Anderson and R. Betti

51st Annual Meeting of the APS Division of Plasma Physics, Atlanta,

GA, USA (November 2009)
<http://meetings.aps.org/Meeting/DPP09/Session/TO5.4>