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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

- Associate Professor**
Institute of Space and Plasma Sciences, National Cheng Kung University, Tainan, Taiwan 2022-present
- Assistant Professor**
Institute of Space and Plasma Sciences, National Cheng Kung University, Tainan, Taiwan 2016-2022
- 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

2023/8/15 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** 1570
H-index 21

Publications

- [1] *A Mini-Marx Generator Powered by a Cockcroft–Walton Voltage Multiplier*
Kaviya Aranganadin, Zhaofeng Zhang, Yen-Cheng Lin, Po-Yu Chang, Hua-Yi Hsu, Ming-Chieh Lin
IEEE Transactions on Plasma Science 50, 3393 (2022)
<https://doi.org/10.1109/TPS.2022.3179585>
- [2] *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 93, 043505 (2022)
<https://doi.org/10.1063/5.0079450>
- [3] *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>
- [4] *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>
- [5] *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>
- [6] *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)
- [7] *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>

[8] *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. Viges, and R. Betti

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

[9] *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>

[10] *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>

[11] *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>

[12] *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>

[13] *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>

[14] *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>

- [15] *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>

- [16] *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>

- [17] *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>

- [18] *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>

- [19] *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>

- [20] *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>

- [21] *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>
- [22] *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>
- [23] *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>
- [24] *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>
- [25] *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>
- [26] *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>
- [27] *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>

[28]

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>

[29]

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>

[30]

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>

[31]

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] *Head on collisions of two supersonic plasma jets* (Invited talk)
Po-Yu Chang, Ming-Hsiang Kuo, Yen-Cheng Lin, Che-Yu Lin, Chih-Hsien Liu, Cheng-Han Du, Chih-Jui Hsieh
Asia-Pacific Conference on Plasma Physics, Remote e-conference (October 2022)
<http://aappsdp.org/DPP2022/html/1about/home.html>
- [2] *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>
- [3] *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. Hassett, 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'eguín, 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>