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Education

State University of New York at Stony Brook <i>Doctor of Philosophy (Ph.D.) in Physics</i> <i>Advisor: Thomas C. Weinacht</i>	2017/09 – 2023/01 <i>Stony Brook, NY, USA</i>
State University of New York at Stony Brook <i>Master in Physics</i> <i>Advisor: Thomas C. Weinacht</i>	2016/09 – 2017/06 <i>Stony Brook, NY, USA</i>
University of Science and Technology of China <i>Bachelor in Physics</i> <i>Advisor: Xuan Sun</i>	2012/09 – 2016/06 <i>Hefei, Anhui, China</i>

Research Experience

Postdoctoral Scholar <i>Stanford University</i> <ul style="list-style-type: none">• Construct and perform cutting-edge ultrafast strong field ionization experiments in Velocity Map Imaging detector system• Derive and writing programs for analyzing multiparticle correlation to uncover many-body interaction in strong field physics.	2023/03 – present <i>Stanford, CA, USA</i>
Research Assistant <i>State University of New York at Stony Brook</i> <ul style="list-style-type: none">• Integrated and debugged Tpx3Cam into the Velocity Map Imaging detector system• Performed ultrafast strong field ionization experiments on molecules like D₂O and CD₂O.• Ph.D. thesis topic: “Momentum Resolved Coincidence and Covariance Measurements of Strong Field Molecular Ionization”	2018/06 – 2023/01 <i>Stony Brook, NY, USA</i>
Undergraduate Research Assistant <i>University of Science and Technology of China</i> <ul style="list-style-type: none">• Designed and set up an electronic system to probe the plasma’s Alfvén wave in the KMAX lab• Bachelor thesis topic: “Effect of Radial Current Turbulence on Tandem Mirror”	2014/06 – 2016/06 <i>Hefei, Anhui, China</i>

Teaching Experience

Teaching Assistant <i>State University of New York at Stony Brook</i> <ul style="list-style-type: none">• PHY 133 Classical Physics Lab• PHY 300 Waves and Optics	2017/09 – 2018/06 <i>Stony Brook, NY, USA</i>
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Awards & Honors

Conference Travel Award <i>State University of New York at Stony Brook</i>
College Math Contest <i>University of Science and Technology of China</i>

Specialized Skills

Language: Chinese (excellent), English (fluent)
Programming Languages: Matlab (professional), Labview (intermediate), Python (intermediate), Root (beginner), java (beginner), C++ (beginner)
Presentation Skills: Microsoft PowerPoint (professional), L^AT_EX (professional)
Other Skills: HTTP, Machine Learning, Ultra-High Vacuum, Nonlinear Optics, High-Speed Imaging (Tpx3Cam), Ultrafast Laser, Strong Field Ionization

American Chemical Society (ACS): The Journal of Physical Chemistry Letters
Optica (formerly OSA): Optics Letters

Conference Presentations

Multi-Particle Cumulant Mapping for Coulomb Explosion Imaging: the Algorithm

Cheng, Chuan; Frasiniski, Leszek; Moğol, Göneng; Allum, Felix; Howard, Andrew; Bucksbaum, Philip; Brouard, Mark; Forbes, Ruaridh; Weinacht, Thomas (APS Division of Atomic and Molecular Physics Meeting 2023)

Ultrafast Molecular Imaging Using 4-Fold Covariance: Coincidence Insight with Covariance Speed

Cheng, Chuan; Frasiniski, Leszek; Moğol, Göneng; Allum, Felix; Howard, Andrew; Bucksbaum, Philip; Brouard, Mark; Forbes, Ruaridh; Weinacht, Thomas (APS Division of Atomic and Molecular Physics Meeting 2022)

Covariance Velocity Map Imaging Measurements of Strong Field Double Ionization

Cheng, Chuan; Singh, Vaibhav; Matsika, Spiridoula; Weinacht, Thomas (APS Division of Atomic and Molecular Physics Meeting 2022)

Strong Field Ionization of Water II: Electronic and Nuclear Dynamics En Route to Double Ionization

Cheng, Chuan; Streeter, Zachary L.; Howard, Andrew J.; Spanner, Michael; Lucchese, Robert R.; McCurdy, C. William; Weinacht, Thomas; Bucksbaum, Philip H.; Forbes, Ruaridh (APS Division of Atomic and Molecular Physics Meeting 2021)

Coincidence measurements of channel resolved above threshold ionization of D₂O molecule

Cheng, Chuan; Forbes, Ruaridh; Howard, Andrew; Bucksbaum, Philip; Weinacht, Thomas (APS Division of Atomic and Molecular Physics Meeting 2020)

Coincidence measurements of strong field molecular double ionization

Cheng, Chuan; Zandbergen, Patricia Vindel; Matsika, Spiridoula; Weinacht, Thomas (74th International Symposium on Molecular Spectroscopy)

Coincidence measurements of strong field molecular double ionization

Cheng, Chuan; Zandbergen, Patricia Vindel; Matsika, Spiridoula; Weinacht, Thomas (APS Division of Atomic and Molecular Physics Meeting 2019)

Publications

1. **Cheng, C.**, Frasiniski, L.J., Moğol, G., Allum, F., Howard, A.J., Bucksbaum, P.H., Forbes, R. and Weinacht, T., 2024. Multiparticle Cumulant Mapping for Coulomb Explosion Imaging: Calculations and Algorithm. *Physical Review A*, 109(4), p.042802.
2. Howard, A.J., Britton, M., Streeter, Z.L., **Cheng, C.**, Forbes, R., Reynolds, J.L., Allum, F., McCracken, G.A., Gabalski, I., Lucchese, R.R., McCurdy, C.W., Weinacht T. and Bucksbaum P. H., 2023. Filming enhanced ionization in an ultrafast triatomic slingshot. *Communications chemistry*, 6(1), p.81.
3. **Cheng, C.**, Frasiniski, L.J., Moğol, G., Allum, F., Howard, A.J., Rolles, D., Bucksbaum, P.H., Brouard, M., Forbes, R. and Weinacht, T., 2023. Multiparticle Cumulant Mapping for Coulomb Explosion Imaging. *Physical Review Letters*, 130(9), p.093001.
4. Davino, M.; McManus, E.; Helming, N. G.; **Cheng, C.**; Moğol, G.; Rodnova, Z.; Harrison, G.; Watson, K.; Weinacht, T.; Gibson, G. N.; Saule, T.; Trallero-Herrero, C. A. A Plano-Convex Thick-Lens Velocity Map Imaging Apparatus for Direct, High Resolution 3D Momentum Measurements of Photoelectrons with Ion Time-of-Flight Coincidence. *Review of Scientific Instruments* 2023, 94 (1), 013303.
5. **Cheng, C.**; Singh, V.; Matsika, S.; Weinacht, T. Strong Field Double Ionization of Formaldehyde Investigated Using Momentum Resolved Covariance Imaging and Trajectory Surface Hopping. *J. Phys. Chem. A* 2022, 126 (40), 7399–7406.

6. Singh, V.; **Cheng. C.**; Weinacht, T.; Matsika, S. Stable Excited Dication: Trapping on the S1 State of Formaldehyde Dication after Strong Field Ionization. *Phys. Chem. Chem. Phys.* 2022, 24 (35), 20701–20708.
7. Aglagul, D.; Kaufman, B.; **Cheng. C.**; Weinacht, T.; Saule, T.; Trallero-Herrero, C. A.; Nomerotski, A. A Simple Approach for Characterizing the Spatially Varying Sensitivity of Microchannel Plate Detectors. *Review of Scientific Instruments* 2022, 93 (7), 075108.
8. **Cheng. C.**; Moğol, G.; Weinacht, T.; Nomerotski, A.; Trallero-Herrero, C. 3D Velocity Map Imaging of Electrons with TPX3CAM. *Review of Scientific Instruments* 2022, 93 (1), 013003.
9. Catanese, A.; Kaufman, B.; **Cheng. C.**; Jones, E.; Cohen, M. G.; Weinacht, T. Acousto-Optic Modulator Pulse-Shaper Compression of Octave-Spanning Pulses from a Stretched Hollow-Core Fiber. *OSA Continuum, OSAC* 2021, 4 (12), 3176–3183.
10. Allum, F.; **Cheng. C.**; Howard, A. J.; Bucksbaum, P. H.; Brouard, M.; Weinacht, T.; Forbes, R. Multi-Particle Three-Dimensional Covariance Imaging: “Coincidence” Insights into the Many-Body Fragmentation of Strong-Field Ionized D₂O. *J. Phys. Chem. Lett.* 2021, 12 (34), 8302–8308.
11. **Cheng. C.**; Streeter, Z. L.; Howard, A. J.; Spanner, M.; Lucchese, R. R.; McCurdy, C. W.; Weinacht, T.; Bucksbaum, P. H.; Forbes, R. Strong-Field Ionization of Water. II. Electronic and Nuclear Dynamics En Route to Double Ionization. *Phys. Rev. A* 2021, 104 (2), 023108.
12. Howard, A. J.; **Cheng. C.**; Forbes, R.; McCracken, G. A.; Mills, W. H.; Makhija, V.; Spanner, M.; Weinacht, T.; Bucksbaum, P. H. Strong-Field Ionization of Water: Nuclear Dynamics Revealed by Varying the Pulse Duration. *Phys. Rev. A* 2021, 103 (4), 043120.
13. **Cheng. C.**; Forbes, R.; Howard, A. J.; Spanner, M.; Bucksbaum, P. H.; Weinacht, T. Momentum-Resolved above-Threshold Ionization of Deuterated Water. *Phys. Rev. A* 2020, 102 (5), 052813.
14. Lam, H. V. S.; Yarlagadda, S.; Venkatachalam, A.; Wangjam, T. N.; Kushawaha, R. K.; **Cheng. C.**; Svihra, P.; Nomerotski, A.; Weinacht, T.; Rolles, D.; Kumarappan, V. Angle-Dependent Strong-Field Ionization and Fragmentation of Carbon Dioxide Measured Using Rotational Wave Packets. *Phys. Rev. A* 2020, 102 (4), 043119.
15. Liu, Y.; Horton, S. L.; Yang, J.; Nunes, J. P. F.; Shen, X.; Wolf, T. J. A.; Forbes, R.; **Cheng. C.**; Moore, B.; Centurion, M.; Hegazy, K.; Li, R.; Lin, M.-F.; Stolow, A.; Hockett, P.; Rozgonyi, T.; Marquetand, P.; Wang, X.; Weinacht, T. Spectroscopic and Structural Probing of Excited-State Molecular Dynamics with Time-Resolved Photoelectron Spectroscopy and Ultrafast Electron Diffraction. *Phys. Rev. X* 2020, 10 (2), 021016.
16. **Cheng. C.**; Vindel-Zandbergen, P.; Matsika, S.; Weinacht, T. Electron Correlation in Channel-Resolved Strong-Field Molecular Double Ionization. *Phys. Rev. A* 2019, 100 (5), 053405.
17. Zhao, A.; **Cheng. C.**; Matsika, S.; Weinacht, T. Quadruple Coincidence Measurement of Electron Correlation in Strong-Field Molecular Double Ionization. *Phys. Rev. A* 2018, 97 (4), 043412.
18. Zhao, A.; van Beuzekom, M.; Bouwens, B.; Byelov, D.; Chakaberia, I.; **Cheng. C.**; Maddox, E.; Nomerotski, A.; Svihra, P.; Visser, J.; Vrba, V.; Weinacht, T. Coincidence Velocity Map Imaging Using Tpx3Cam, a Time Stamping Optical Camera with 1.5 Ns Timing Resolution. *Review of Scientific Instruments* 2017, 88 (11), 113104.