



## James P. Cryan

Associate Professor of Photon Science

Photon Science Directorate

 Curriculum Vitae available Online

### Bio

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#### BIO

I am interested in photo-induced dynamics of atoms and molecules. I am particularly interested in the dynamics of excited states in these systems, and how energy transfer takes place inside a molecule. The relevant timescales for these interactions is typically in the range of attoseconds to picoseconds. These dynamics include photo-triggered chemistry such as non Born-Oppenheimer molecular dynamics and quantum phenomena in strong-field driven systems. I also develop tools for studying these dynamics in the time domain.

My research builds on my extensive experience with ultrafast optical laser science and technology. As a graduate student at Stanford University I participated in the first experiments at the Linac Coherent Light Source, where we studied a new regime of X-ray-matter interactions. I was a postdoctoral scholar at Lawrence Berkeley National Laboratory before returning to SLAC to lead the attosecond science group.

#### CURRENT ROLE AT STANFORD

Principal Investigator, Stanford PULSE Institute

Atomic, Molecular, and Optical Sciences Department Head, Linac Coherent Light Source.

#### ACADEMIC APPOINTMENTS

- Associate Professor, Photon Science Directorate
- Principal Investigator, Stanford PULSE Institute

#### HONORS AND AWARDS

- APS Fellow, American Physical Society (2020)
- William E. and Diane M. Spicer Young Investigator Award, SLAC National Accelerator Laboratory (2012)

#### BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Atomic, Molecular, and Optical Sciences Department Head, Linac Coherent Light Source, SLAC National Accelerator Laboratory (2021 - present)
- Principle Investigator, Stanford PULSE Institute (2014 - present)

#### PROFESSIONAL EDUCATION

- B.S., The Ohio State University , Engineering Physics (2007)
- Ph.D., Stanford University , Physics (2012)

#### SERVICE, VOLUNTEER, AND COMMUNITY WORK

- Physical Review X Editorial Board (January 20, 2025)

## LINKS

- AMO Science Department @ LCLS: <https://lcls.slac.stanford.edu/depts/amo>
- My Lab Website: <https://ultrafast.stanford.edu/research/attosecond-phenomenon>

## Teaching

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### STANFORD ADVISEES

#### Doctoral Dissertation Advisor (AC)

John Walters

#### Doctoral Dissertation Reader (NonAC)

Erik Isele

## Professional

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### PROFESSIONAL INTERESTS

I am interested in photo-induced dynamics of atoms and molecules. I am particularly interested in the dynamics of excited states in these systems, and how energy transfer takes place inside a molecule. The relevant timescales for these interactions is typically in the range of attoseconds to picoseconds. These dynamics include photo-triggered chemistry such as non Born-Oppenheimer molecular dynamics and quantum phenomena in strong-field driven systems. I also develop tools for studying these dynamics in the time domain.

## Publications

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### PUBLICATIONS

- **Attosecond X-ray sources, methods, and applications at present and future free-electron lasers: tutorial** *ADVANCES IN OPTICS AND PHOTONICS*  
Berrah, N., Cryan, J., Robles, R., Driver, T., Marinelli, A., Bucksbaum, P.  
2025; 17 (3): 623-725
- **Attosecond delays in X-ray molecular ionization.** *Nature*  
Driver, T., Moutney, M., Wang, J., Ortmann, L., Al-Haddad, A., Berrah, N., Bostedt, C., Champenois, E. G., DiMauro, L. F., Duris, J., Garratt, D., Glowia, J. M., Guo, et al  
2024; 632 (8026): 762-767
- **Terawatt-scale attosecond X-ray pulses from a cascaded superradiant free-electron laser** *NATURE PHOTONICS*  
Franz, P., Li, S., Driver, T., Robles, R. R., Cesar, D., Isele, E., Guo, Z., Wang, J., Duris, J. P., Larsen, K., Glowia, J. M., Cheng, X., Hoffmann, et al  
2024
- **Experimental demonstration of attosecond pump-probe spectroscopy with an X-ray free-electron laser** *NATURE PHOTONICS*  
Guo, Z., Driver, T., Beauvarlet, S., Cesar, D., Duris, J., Franz, P. L., Alexander, O., Bohler, D., Bostedt, C., Averbukh, V., Cheng, X., DiMauro, L. F., Doumy, et al  
2024
- **Photon energy-resolved velocity map imaging from spectral domain ghost imaging** *NEW JOURNAL OF PHYSICS*  
Wang, J., Driver, T., Allum, F., Papadopoulou, C. C., Passow, C., Brenner, G., Li, S., Duesterer, S., Tul Noor, A., Kumar, S., Bucksbaum, P. H., Erk, B., Forbes, et al  
2023; 25 (3)
- **Attosecond coherent electron motion in Auger-Meitner decay.** *Science (New York, N.Y.)*  
Li, S., Driver, T., Rosenberger, P., Champenois, E. G., Duris, J., Al-Haddad, A., Averbukh, V., Barnard, J. C., Berrah, N., Bostedt, C., Bucksbaum, P. H., Coffee, R. N., DiMauro, et al  
1800: eabj2096

- **The development of attosecond XFELs for understanding ultrafast electron motion** *ADVANCES IN ATOMIC, MOLECULAR, AND OPTICAL PHYSICS, VOL. 71*  
Cryan, J. P., Driver, T., Duris, J., Guo, Z., Li, S., O'Neal, J. T., Marinelli, A.  
edited by DiMauro, L. F., Perrin, H., Yelin, S. F.  
2022; 71: 1-64
- **Controllable X-Ray Pulse Trains from Enhanced Self-Amplified Spontaneous Emission.** *Physical review letters*  
Duris, J. P., MacArthur, J. P., Glownia, J. M., Li, S., Vetter, S., Miahnahri, A., Coffee, R., Hering, P., Fry, A., Welch, M. E., Lutman, A., Decker, F., Bohler, et al  
2021; 126 (10): 104802
- **Electron correlation effects in attosecond photoionization of CO<sub>2</sub>** *PHYSICAL REVIEW A*  
Kamalov, A., Wang, A. L., Bucksbaum, P. H., Haxton, D. J., Cryan, J. P.  
2020; 102 (2)
- **Electronic Population Transfer via Impulsive Stimulated X-Ray Raman Scattering with Attosecond Soft-X-Ray Pulses.** *Physical review letters*  
O'Neal, J. T., Champenois, E. G., Oberli, S., Obaid, R., Al-Haddad, A., Barnard, J., Berrah, N., Coffee, R., Duris, J., Galinis, G., Garratt, D., Glownia, J. M., Haxton, et al  
2020; 125 (7): 073203
- **Tunable isolated attosecond X-ray pulses with gigawatt peak power from a free-electron laser** *NATURE PHOTONICS*  
Duris, J., Li, S., Driver, T., Champenois, E. G., MacArthur, J. P., Lutman, A. A., Zhang, Z., Rosenberger, P., Aldrich, J. W., Coffee, R., Coslovich, G., Decker, F., Glownia, et al  
2020; 14 (1): 30-+
- **Attosecond transient absorption spooktroscopy: a ghost imaging approach to ultrafast absorption spectroscopy.** *Physical chemistry chemical physics : PCCP*  
Driver, T., Li, S., Champenois, E. G., Duris, J., Ratner, D., Lane, T. J., Rosenberger, P., Al-Haddad, A., Averbukh, V., Barnard, T., Berrah, N., Bostedt, C., Bucksbaum, et al  
2019
- **Development of ultrafast capabilities for X-ray free-electron lasers at the linac coherent light source** *PHILOSOPHICAL TRANSACTIONS OF THE ROYAL SOCIETY A-MATHEMATICAL PHYSICAL AND ENGINEERING SCIENCES*  
Coffee, R. N., Cryan, J. P., Duris, J., Helml, W., Li, S., Marinelli, A.  
2019; 377 (2145)
- **Characterizing isolated attosecond pulses with angular streaking** *OPTICS EXPRESS*  
Li, S., Guo, Z., Coffee, R. N., Hegazy, K., Huang, Z., Natan, A., Osipov, T., Ray, D., Marinelli, A., Cryan, J. P.  
2018; 26 (4): 4531-47
- **Attosecond X-Ray Core-Level Chronoscopy of Aromatic Molecules** *PHYSICAL REVIEW X*  
Ji, J., Guo, Z., Driver, T., Trevisan, C. S., Cesar, D., Cheng, X., Duris, J., Franz, P. L., Glownia, J., Gong, X., Hammerland, D., Han, M., Heck, et al  
2025; 15 (4)
- **Imaging Valence Electron Rearrangement in a Chemical Reaction Using Hard X-Ray Scattering.** *Physical review letters*  
Gabalski, I., Green, A., Lenzen, P., Allum, F., Bain, M., Bhattacharyya, S., Britton, M. A., Champenois, E. G., Cheng, X., Cryan, J. P., Driver, T., Forbes, R., Garratt, et al  
2025; 135 (8): 083001
- **Imaging Valence Electron Rearrangement in a Chemical Reaction Using Hard X-Ray Scattering** *PHYSICAL REVIEW LETTERS*  
Gabalski, I., Green, A., Lenzen, P., Allum, F., Bain, M., Bhattacharyya, S., Britton, M. A., Champenois, E. G., Cheng, X., Cryan, J. P., Driver, T., Forbes, R., Garratt, et al  
2025; 135 (8)
- **Imaging a light-induced molecular elimination reaction with an X-ray free-electron laser.** *Nature communications*  
Li, X., Boll, R., Vindel-Zandbergen, P., González-Vázquez, J., Rivas, D. E., Bhattacharyya, S., Borne, K., Chen, K., De Fanis, A., Erk, B., Forbes, R., Green, A. E., Ilchen, et al  
2025; 16 (1): 7006
- **The time-resolved atomic, molecular and optical science instrument at the Linac Coherent Light Source. Corrigendum.** *Journal of synchrotron radiation*

Walter, P., Osipov, T., Lin, M. F., Cryan, J., Driver, T., Kamalov, A., Marinelli, A., Robinson, J., Seaberg, M. H., Wolf, T. J., Aldrich, J., Brown, N., Champenois, et al  
2025

- **Spectrotemporal Shaping of Attosecond X-Ray Pulses with a Fresh-Slice Free-Electron Laser.** *Physical review letters*  
Robles, R. R., Larsen, K. A., Cesar, D., Driver, T., Duris, J., Franz, P., Garratt, D., Guo, V., Just, G., Lemons, R., Lin, M. F., Obaid, R., Sudar, et al  
2025; 134 (11): 115001
- **Probing Electronic Coherence between Core-Level Vacancies at Different Atomic Sites** *PHYSICAL REVIEW X*  
Wang, J., Driver, T.  
2025; 15: 011008
- **Relativistic effects in molecular photoemission delays** *PHYSICAL REVIEW A*  
Grafstrom, B., Wang-Holtzen, A., Wang, J., Bucksbaum, P. H., Cryan, J. P., Landsman, A. S.  
2024; 110 (6)
- **Design and performance of a magnetic bottle electron spectrometer for high-energy photoelectron spectroscopy.** *The Review of scientific instruments*  
Borne, K., O'Neal, J. T., Wang, J., Isele, E., Obaid, R., Berrah, N., Cheng, X., Bucksbaum, P. H., James, J., Kamalov, A., Larsen, K. A., Li, X., Lin, et al  
2024; 95 (12)
- **"Beam à la carte": Laser heater shaping for attosecond pulses in a multiplexed x-ray free-electron laser** *APPLIED PHYSICS LETTERS*  
Li, S., Zhang, Z., Alverson, S., Cesar, D., Driver, T., Franz, P., Isele, E., Duris, J. P., Larsen, K., Lin, M., Obaid, R., O'Neal, J. T., Robles, et al  
2024; 125 (19)
- **Tracking dissociation pathways of nitrobenzene via mega-electron-volt ultrafast electron diffraction** *JOURNAL OF PHYSICS B-ATOMIC MOLECULAR AND OPTICAL PHYSICS*  
Hegazy, K., Bucksbaum, P., Centurion, M., Cryan, J., Li, R., Lin, M., Moore, B., Nunes, P., Shen, X., Weathersby, S., Yang, J., Wang, X., Wolf, et al  
2024; 57 (19)
- **Attosecond impulsive stimulated X-ray Raman scattering in liquid water.** *Science advances*  
Alexander, O., Egun, F., Rego, L., Gutierrez, A. M., Garratt, D., Cardenas, G. A., Nogueira, J. J., Lee, J. P., Zhao, K., Wang, R. P., Ayuso, D., Barnard, J. C., Beauvarlet, et al  
2024; 10 (39): eadp0841
- **Efficient prediction of attosecond two-colour pulses from an X-ray free-electron laser with machine learning.** *Scientific reports*  
Alaa El-Din, K. K., Alexander, O. G., Frasiniski, L. J., Mintert, F., Guo, Z., Duris, J., Zhang, Z., Cesar, D. B., Franz, P., Driver, T., Walter, P., Cryan, J. P., Marinelli, et al  
2024; 14 (1): 7267
- **Attosecond-pump attosecond-probe x-ray spectroscopy of liquid water.** *Science (New York, N.Y.)*  
Li, S., Lu, L., Bhattacharyya, S., Pearce, C., Li, K., Nienhuis, E. T., Doumy, G., Schaller, R. D., Moeller, S., Lin, M. F., Dakovski, G., Hoffman, D. J., Garratt, et al  
2024: eadn6059
- **Applying Bayesian inference and deterministic anisotropy to retrieve the molecular structure  $\Psi(\mathbf{R})$  distribution from gas-phase diffraction experiments** *COMMUNICATIONS PHYSICS*  
Hegazy, K., Makhija, V., Bucksbaum, P., Corbett, J., Cryan, J., Hartmann, N., Ilchen, M., Jobe, K., Li, R., Makasyuk, I., Shen, X., Wang, X., Weathersby, et al  
2023; 6 (1)
- **Compact single-shot soft X-ray photon spectrometer for free-electron laser diagnostics** *OPTICS EXPRESS*  
Larsen, K. A., Borne, K., Obaid, R., Kamalov, A., Liu, Y., Cheng, X., James, J., Driver, T., Li, K., Liu, Y., Sakdinawat, A., David, C., Wolf, et al  
2023; 31 (22): 35822-35834
- **Femtosecond Electronic and Hydrogen Structural Dynamics in Ammonia Imaged with Ultrafast Electron Diffraction.** *Physical review letters*  
Champenois, E. G., List, N. H., Ware, M., Britton, M., Bucksbaum, P. H., Cheng, X., Centurion, M., Cryan, J. P., Forbes, R., Gabalski, I., Hegazy, K., Hoffmann, M. C., Howard, et al  
2023; 131 (14): 143001

- **Time-Resolved X-ray Photoelectron Spectroscopy: Ultrafast Dynamics in CS<sub>2</sub> Probed at the S 2p Edge.** *The journal of physical chemistry letters*  
Gabalski, I., Allum, F., Seidu, I., Britton, M., Brenner, G., Bromberger, H., Brouard, M., Bucksbaum, P. H., Burt, M., Cryan, J. P., Driver, T., Ekanayake, N., Erk, et al  
2023: 7126-7133
- **Rehybridization dynamics into the pericyclic minimum of an electrocyclic reaction imaged in real-time.** *Nature communications*  
Liu, Y., Sanchez, D. M., Ware, M. R., Champenois, E. G., Yang, J., Nunes, J. P., Attar, A., Centurion, M., Cryan, J. P., Forbes, R., Hegazy, K., Hoffmann, M. C., Ji, et al  
2023; 14 (1): 2795
- **Effect of the shot-to-shot variation on charge migration induced by sub-fs x-ray free-electron laser pulses** *PHYSICAL REVIEW RESEARCH*  
Grell, G., Guo, Z., Driver, T., Decleva, P., Plesiat, E., Picon, A., Gonzalez-Vazquez, J., Walter, P., Marangos, J. P., Cryan, J. P., Marinelli, A., Palacios, A., Martin, et al  
2023; 5 (2)
- **The time-resolved atomic, molecular and optical science instrument at the Linac Coherent Light Source.** *Journal of synchrotron radiation*  
Walter, P., Osipov, T., Lin, M. F., Cryan, J., Driver, T., Kamalov, A., Marinelli, A., Robinson, J., Seaberg, M. H., Wolf, T. J., Aldrich, J., Brown, N., Champenois, et al  
2022; 29 (Pt 4): 957-968
- **Characterization of single-shot attosecond pulses with angular streaking photoelectron spectra** *PHYSICAL REVIEW A*  
Zhao, X., Li, S., Driver, T., Van-Hung Hoang, Anh-Thu Le, Cryan, J. P., Marinelli, A., Lin, C. D.  
2022; 105 (1)
- **Role of nuclear-electronic coupling in attosecond photoionization of H-2** *PHYSICAL REVIEW A*  
Wang, A. L., Serov, V. V., Kamalov, A., Bucksbaum, P. H., Kheifets, A., Cryan, J. P.  
2021; 104 (6)
- **Time-resolved pump-probe spectroscopy with spectral domain ghost imaging.** *Faraday discussions*  
Li, S., Driver, T., Alexander, O., Cooper, B., Garratt, D., Marinelli, A., Cryan, J. P., Marangos, J. P.  
2021
- **Transient resonant Auger-Meitner spectra of photoexcited thymine.** *Faraday discussions*  
Wolf, T. J., Paul, A. C., Folkestad, S. D., Myhre, R. H., Cryan, J. P., Berrah, N., Bucksbaum, P. H., Coriani, S., Coslovich, G., Feifel, R., Martinez, T. J., Moeller, S. P., Mucke, et al  
2021
- **Electron-ion coincidence measurements of molecular dynamics with intense X-ray pulses.** *Scientific reports*  
Li, X., Inhester, L., Osipov, T., Boll, R., Coffee, R., Cryan, J., Gattton, A., Gorkhover, T., Hartman, G., Ilchen, M., Knie, A., Lin, M., Minitti, et al  
2021; 11 (1): 505
- **Inner Valence Hole Migration in Isopropanol**  
Alexander, O., Barillot, T., Cooper, B., Driver, T., Garratt, D., Li, S., Marinelli, A., Cryan, J. P., Marangos, J. P., LR25 Collaboration, IEEE  
IEEE.2021
- **Arrival Time Monitor for Sub-10 fs Soft X-ray and 800 nm Optical Pulses**  
Muhammad, I., Frimpong, B., Daafour, J., Xu, X., Walter, P., Wolf, T. J. A., Cryan, J. P., Glowonia, J. M., Robinson, J. S., Droste, S., Coslovich, G., IEEE  
IEEE.2021
- **Characterizing Multiphoton Excitation Using Time-Resolved X-ray Scattering** *PHYSICAL REVIEW X*  
Bucksbaum, P. H., Ware, M. R., Natan, A., Cryan, J. P., Glowonia, J. M.  
2020; 10 (1)
- **Two-Photon Antenna Sensitization of Curium: Evidencing Metal-Driven Effects on Absorption Cross Section in f-Element Complexes.** *The journal of physical chemistry letters*  
Pallares, R. M., Sturzbecher-Hoehne, M. n., Shivaram, N. H., Cryan, J. P., D'Aléo, A. n., Abergel, R. J.  
2020: 6063-67
- **Strictly non-adiabatic quantum control of the acetylene dication using an infrared field.** *The Journal of chemical physics*

- Liekhus-Schmaltz, C. n., Zhu, X. n., McCracken, G. A., Cryan, J. P., Martinez, T. J., Bucksbaum, P. H.  
2020; 152 (18): 184302
- **On the limits of observing motion in time-resolved X-ray scattering** *PHILOSOPHICAL TRANSACTIONS OF THE ROYAL SOCIETY A-MATHEMATICAL PHYSICAL AND ENGINEERING SCIENCES*  
Ware, M. R., Glowonia, J. M., Natan, A., Cryan, J. P., Bucksbaum, P. H.  
2019; 377 (2145)
  - **Development of ultrafast capabilities for X-ray free-electron lasers at the linac coherent light source.** *Philosophical transactions. Series A, Mathematical, physical, and engineering sciences*  
Coffee, R. N., Cryan, J. P., Duris, J., Helml, W., Li, S., Marinelli, A.  
2019; 377 (2145): 20180386
  - **On the limits of observing motion in time-resolved X-ray scattering.** *Philosophical transactions. Series A, Mathematical, physical, and engineering sciences*  
Ware, M. R., Glowonia, J. M., Natan, A., Cryan, J. P., Bucksbaum, P. H.  
2019; 377 (2145): 20170477
  - **Ultrafast photodissociation dynamics and nonadiabatic coupling between excited electronic states of methanol probed by time-resolved photoelectron spectroscopy.** *The Journal of chemical physics*  
Champenois, E. G., Greenman, L., Shivaram, N., Cryan, J. P., Larsen, K. A., Rescigno, T. N., McCurdy, C. W., Belkacem, A., Slaughter, D. S.  
2019; 150 (11): 114301
  - **Generation and Characterization of Attosecond Pulses from an X-ray Free-electron Laser**  
Li, S., Rosenberger, P., Champenois, E. G., Driver, T., Bucksbaum, P. H., Coffee, R., Gattton, A., Hartmann, G., Helml, W., Huang, Z., Knurr, J., Kling, M. F., Lin, et al  
IEEE.2019
  - **Imaging CF3I conical intersection and photodissociation dynamics with ultrafast electron diffraction.** *Science (New York, N.Y.)*  
Yang, J., Zhu, X., Wolf, T. J., Li, Z., Nunes, J. P., Coffee, R., Cryan, J. P., Gühr, M., Hegazy, K., Heinz, T. F., Jobe, K., Li, R., Shen, et al  
2018; 361 (6397): 64-67
  - **Imaging CF3I conical intersection and photodissociation dynamics with ultrafast electron diffraction** *Science*  
Yang, J., Zhu, X., Wolf, T. J., Li, Z., Nunes, J. F., Coffee, R., Cryan, J. P., Gühr, M., Hegazy, K., Heinz, T. F., Jobe, K., Li, R., Shen, et al  
2018; 361 (6397): 64-67
  - **Ultrafast isomerization in acetylene dication after carbon K-shell ionization** *NATURE COMMUNICATIONS*  
Li, Z., Inhester, L., Liekhus-Schmaltz, C., Curchod, B. F. E., Snyder, J. W., Medvedev, N., Cryan, J., Osipov, T., Pabst, S., Vendrell, O., Bucksbaum, P., Martinez, T. J.  
2017; 8: 453
  - **Observing Femtosecond Fragmentation Using Ultrafast X-ray-Induced Auger Spectra** *APPLIED SCIENCES-BASEL*  
Wolf, T. J. A., Holzmeier, F., Wagner, I., Berrah, N., Bostedt, C., Bozek, J., Bucksbaum, P., Coffee, R., Cryan, J., Farrell, J., Feifel, R., Martinez, T. J., McFarland, et al  
2017; 7 (7)
  - **Ultrafast dynamics of the lowest-lying neutral states in carbon dioxide** *PHYSICAL REVIEW A*  
Wright, T. W., Champenois, E. G., Cryan, J. P., Shivaram, N., Yang, C., Belkacem, A.  
2017; 95 (2)
  - **Coherent control using kinetic energy and the geometric phase of a conical intersection.** *journal of chemical physics*  
Liekhus-Schmaltz, C., McCracken, G. A., Kaldun, A., Cryan, J. P., Bucksbaum, P. H.  
2016; 145 (14): 144304-?
  - **Involvement of a low-lying Rydberg state in the ultrafast relaxation dynamics of ethylene.** *The Journal of chemical physics*  
Champenois, E. G., Shivaram, N. H., Wright, T. W., Yang, C. S., Belkacem, A., Cryan, J. P.  
2016; 144 (1): 014303
  - **Coherent control using kinetic energy and the geometric phase of a conical intersection** *The Journal of Chemical Physics*  
Liekhus-Schmaltz, C. E., McCracken, G. A., Kaldun, A., Cryan, J. P., Bucksbaum, P. H.  
2016; 145: 144304

- **Shapes and vorticities of superfluid helium nanodroplets** *SCIENCE*  
Gomez, L. F., Ferguson, K. R., Cryan, J. P., Bacellar, C., Tanyag, R. M., Jones, C., Schorb, S., Anielski, D., Belkacem, A., Bernando, C., Boll, R., Bozek, J., Carron, et al  
2014; 345 (6199): 906-909
- **Helium superfluidity. Shapes and vorticities of superfluid helium nanodroplets.** *Science*  
Gomez, L. F., Ferguson, K. R., Cryan, J. P., Bacellar, C., Tanyag, R. M., Jones, C., Schorb, S., Anielski, D., Belkacem, A., Bernando, C., Boll, R., Bozek, J., Carron, et al  
2014; 345 (6199): 906-909
- **Enhancement of strong-field multiple ionization in the vicinity of the conical intersection in 1,3-cyclohexadiene ring opening** *JOURNAL OF CHEMICAL PHYSICS*  
Petrovic, V. S., Schorb, S., Kim, J., White, J., Cryan, J. P., Glownia, J. M., Zipp, L., Broege, D., Miyabe, S., Tao, H., Martinez, T., Bucksbaum, P. H.  
2013; 139 (18)
- **Transient X-Ray Fragmentation: Probing a Prototypical Photoinduced Ring Opening** *PHYSICAL REVIEW LETTERS*  
Petrovic, V. S., Siano, M., White, J. L., Berrah, N., Bostedt, C., Bozek, J. D., Broege, D., Chalfin, M., Coffee, R. N., Cryan, J., Fang, L., Farrell, J. P., Frasinski, et al  
2012; 108 (25)
- **Ultrafast absorption of intense x rays by nitrogen molecules** *JOURNAL OF CHEMICAL PHYSICS*  
Buth, C., Liu, J., Chen, M. H., Cryan, J. P., Fang, L., Glownia, J. M., Hoener, M., Coffee, R. N., Berrah, N.  
2012; 136 (21)
- **Ensemble of Linear Molecules in Nondispersing Rotational Quantum States: A Molecular Stopwatch** *PHYSICAL REVIEW X*  
Cryan, J. P., Glownia, J. M., Broege, D. W., Ma, Y., Bucksbaum, P. H.  
2011; 1 (1)
- **Auger Electron Angular Distribution of Double Core-Hole States in the Molecular Reference Frame** *PHYSICAL REVIEW LETTERS*  
Cryan, J. P., Glownia, J. M., Andreasson, J., Belkacem, A., Berrah, N., Blaga, C. I., Bostedt, C., Bozek, J., Buth, C., DiMauro, L. F., Fang, L., Gessner, O., Guehr, et al  
2010; 105 (8)
- **Field-free alignment in repetitively kicked nitrogen gas** *PHYSICAL REVIEW A*  
Cryan, J. P., Bucksbaum, P. H., Coffee, R. N.  
2009; 80 (6)