

Yan Zhou

Address

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Degrees

B.S., Physics, Chemistry, Biology, Peking University, Yuanpei college, 2007
Ph.D., Physical Chemistry, Massachusetts Institute of Technology, 2014

Appointments

Assistant Professor, Department of Physics and Astronomy, University of Nevada, Las Vegas,
2020.1-present
Post-Doctorate, Joint Institute for Laboratory Astrophysics, Boulder, 2014.10-2019.10
Advisors: Eric A. Cornell and Jun Ye
Research Assistant, Massachusetts Institute of Technology, 2008.6-2014.8
Advisor: Robert W. Field
Teaching Assistant, Massachusetts Institute of Technology, 2007.8-2008.6
Research Assistant, Peking University, 2004.6-2007.6
Advisor: Xincheng Zhao

Research interests

Explore new physics beyond the Standard Model using ultracold molecular ions.
Cold collisions between molecular radicals and ions.
Broadband and high-resolution spectroscopy.
Hybrid quantum computation.

Committees and Honors

Member, American Physics Society, 2013 - present
Graduate student best poster award, MIT, 2012
C.P. Chu and Y. Lai Graduate Fellowship at MIT, 2011
Lester Wolfe Graduate Fellowship at MIT, 2009
summa cum laude, Peking University, 2007

Fundings

UNLV FOA award, PI (\$20,000, 2021.7 – 2022.6)
NSF MRI, lead PI (\$828,904, 2021.9 – 2024.8)

Students

Trevor Taylor (U, MS, 2020.1-), Rodrigo Fernandez (PhD, 2021.9-), Timothy Chung (MS, 2020.8-), Weilun Tang (U, 2021.1-), Bernardo Gutierrez (U, 2021.9-)
Matthew Cooper (Visitor, 2020.8-2021.4), Antonio Bernadino (U, 2020.1-2021.5), Oliver Walton (U, 2020.1-2021.5), Thomas Conibear (U, 2020.1-2020.12), Jacob Clark (U, 2020.1-2020.12), Jeremiah Foley (U, 2020.1-2020.12)

Publications

1. Kia Boon Ng, Yan Zhou, Lan Cheng, Noah Schlossberger, Sun Yool Park, Tanya S Roussy, Luke Caldwell, Yuval Shagam, Antonio J Vigil, Eric A Cornell, Jun Ye. (2022). Spectroscopy on the electron-electric-dipole-moment-sensitive states of ThF⁺, *Physical Review A*, 105(2), 022823.
2. Roussy, T. S., Palken, D.A., Cairncross, W. B., Brubaker, B. M., Gresh, D. N., Grau, M., Cossel, K. C., Ng, K., Shagam, Y., Zhou, Y., Flambaum, V. V., Lehnert, K. W., Ye, J., Cornell, E. A. (2021). Experimental constraint on axion-like particle coupling over seven orders of magnitude in mass, *Physical Review Letters*, 126(17), 171301.
3. Shagam, Y., Cairncross, W. B., Roussy, T. S., Zhou, Y., Ng, K., Gresh, D. N., Grogan, T., Ye, J., Cornell, E. A. (2020). Continuous temporal detection combined with time-gated imaging: complementary data sets from a single shot. *Journal of Molecular Spectroscopy*, 368, 111257.
4. Zhou, Y., Shagam, Y., Cairncross, B. W., Ng, K. B., Roussy, T. S., Grogan, T., Zelevinsky, T., Ye, J., Cornell, E. A. (2020). Second-scale coherence measured at the projection noise limit with hundreds of molecular ions. *Physical Review Letters*, 124(5), 053201.
5. Zhou, Y., Ng, K. B., Cheng L., Gresh, D. N., Field, R.W., Ye, J., Cornell, E. A. Visible and Ultraviolet Laser Spectroscopy of ThF. (2019) *Journal of Molecular Spectroscopy*, 358, 1.
6. Cairncross, W. B., Gresh, D. N., Grau, M., Cossel, K. C., Roussy, T. S., Ni, Y., Zhou, Y., Ye, J., Cornell, E. A. (2017). Precision Measurement of the Electron's Electric Dipole Moment Using Trapped Molecular Ions. *Physical Review Letters*, 119(15), 153001.
7. Grimes, D. D., Coy, S. L., Barnum, T. J., Zhou, Y., Yelin, S. F., Field, R. W. (2017). Direct single-shot observation of millimeter-wave superradiance in Rydberg-Rydberg transitions. *Physical Review A*, 95(4), 043818.
8. Grimes, D. D., Barnum, T. J., Zhou, Y., Colombo, A. P., Field, R. W. (2017). Coherent laser-millimeter-wave interactions en route to coherent population transfer. *Journal of Chemical Physics*, 147(14), 144201.
9. Gresh, D. N., Cossel, K. C., Zhou, Y., Ye, J., Cornell, E. A. (2016). Broadband velocity modulation spectroscopy of ThF⁺ for use in a measurement of the electron electric dipole moment. *Journal of Molecular Spectroscopy*, 319, 1.
10. Coy, S. L., Grimes, D. D., Zhou, Y., Field, R. W., Wong, B. M. (2016). Electric potential invariants and ions-in-molecules effective potentials for molecular Rydberg states. *Journal of Chemical Physics*, 145(23), 234301.
11. Zhou, Y., Grimes, D. D., Barnum, T. J., Patterson, D., Coy, S. L., Klein, E., Muentner, J. S., Field, R. W. (2015). Direct detection of Rydberg-Rydberg millimeter-wave transitions in a buffer gas cooled molecular beam. *Chemical Physics Letters*, 640, 124
12. Velian, A., Nava, M., Temprado, M., Zhou, Y., Field, R. W., and Cummins, C. C. (2014). A Retro Diels-Alder Route to Diphosphorus Chemistry: Molecular Precursor Synthesis, Kinetics of P₂ Transfer

- to 1,3-Dienes, and Detection of P2 by Molecular Beam Mass Spectrometry. *Journal of the American Chemical Society*, 136(39), 13586.
13. Colombo, A. P., **Zhou, Y.**, Prozument, K., Coy, S. L., Field, R. W. (2013). Chirped-pulse millimeter-wave spectroscopy: Spectrum, dynamics, and manipulation of Rydberg–Rydberg transitions. *Journal of Chemical Physics*, 138(1), 014301.
 14. **Zhou, Y.** (2012). Cooperative effects in a dense Rydberg gas. *Molecular Physics*, 110(15–16), 1909.
 15. Prozument, K., Colombo, A., **Zhou, Y.**, Park, G., Petrović, V., Coy, S., Field, R. W. (2011). Chirped-Pulse Millimeter-Wave Spectroscopy of Rydberg-Rydberg Transitions. *Physical Review Letters*, 107(14), 143001.
 16. Fleischer, S., **Zhou, Y.**, Field, R. W., Nelson, K. A. (2011). Molecular Orientation and Alignment by Intense Single-Cycle THz Pulses. *Physical Review Letters*, 107(16), 163603.
 17. Chen, X., **Zhou, Y.**, Qu, P., Zhao, X. (2008). Base-by-base dynamics in DNA hybridization probed by fluorescence correlation spectroscopy. *Journal of the American Chemical Society*, 130(50), 16947.

Invited talks

1. Rydberg states via CPmmW Spectroscopy. (2012). *Workshop of Heavy Rydberg Physics, at the Institute for Theoretical, Atomic and Molecular and Optical Physics (ITAMP), Harvard*
2. Rydberg states via CPmmW Spectroscopy. (2012). *AMO Physics Symposium, JILA, CU Boulder*
3. Rydberg states via CPmmW Spectroscopy. (2013). *Physics Symposium, Peking University, China*
4. Direct observation of Rydberg-Rydberg transitions via CPmmW spectroscopy. (2014). *Modern Optics Symposium, MIT*
5. Direct observation of Rydberg-Rydberg transitions via CPmmW spectroscopy. (2014). *AMO Physics Symposium, Harvard University*
6. Direct observation of Rydberg-Rydberg transitions via CPmmW spectroscopy. (2014). *Physics Symposium, Wesleyan University*
7. Progress of JILA eEDM experiment with trapped HfF^+ ions. 8th International conference on Fundamental Physics Using Atoms, Kyoto University, Japan
8. A precision measurement of the electron's Electric Dipole Moment using trapped molecular ions. (2018). Cold and controlled molecules and ions (CCMI), University of Georgia, GA
9. A precision measurement of the electron's electric dipole moment using trapped molecular ions. (2019). The 2nd North American Conference on Trapped Ions (NACTI), University of Maryland in College Park, MD
10. Playing with molecular ions, from precision measurement to cold chemistry. (2019). UNLV-QLCI workshop, Las Vegas, NV
11. Playing with molecular ions, from precision measurement to cold chemistry. (2020). Physics Colloquium, Idaho State University
12. Testing fundamental symmetries by precision measurements using polar molecular ions. (2022). Nuclear physics seminar, Michigan State University.