Exponent®
Engineering & Scientific Consulting

Kenneth Wang, Ph.D.

Scientist | Electrical Engineering and Computer Science
Natick
+1-508-652-8596 | kwang@exponent.com

Professional Profile

Dr. Wang is a physicist with expertise in electronic control systems, optics, and quantum science. He brings experience in analog and digital circuit design, optical instrumentation (e.g. semiconductor, solid-state and fiber lasers, acousto optics, electro optics, fiber optics), and control software development (e.g. efficient hardware and remote user interfaces). He helps clients tackle technical challenges ranging from product performance characterization to product failure analysis using techniques that include, amongst others, laboratory testing and numerical simulations.

Prior to joining Exponent, Dr. Wang completed a stint as a postdoctoral fellow at Harvard University directly continuing his graduate work on the physical implementation of a quantum computer and simulator utilizing ultracold atoms and molecules trapped in optical tweezers. During his postdoctoral and graduate appointments, he conducted research on quantum phase transitions and fundamental molecular physics. Maintaining and upgrading the experimental apparatus involved advanced skills in the manipulation of coherent light (from lasers), control of optical devices and development of software capable of precision timing. For example, his work included utilizing electro-optical and acousto-optical devices, as well as low-noise analog circuitry, to stabilize a laser's intensity to better than a percent. To conduct experiments and analyze their results, he developed skills in high performance scientific computing.

Dr. Wang is familiar with a range of software languages and tools including MATLAB, Python, C++, Javascript, Mathematica, Altium, Inventor and Verilog.

Academic Credentials & Professional Honors

Ph.D., Physics, Harvard University, 2024

M.A., Physics, Harvard University, 2020

A.B., Chemistry & Physics, Harvard University, 2017

Academic Appointments

Postdoctoral Fellow, Chemistry and Chemical Biology, Harvard University, 2025

Research Assistant, Physics, Harvard University. 2017-2025

Teaching Fellow, Physics, Harvard University, 2022

Teaching Fellow, Mathematics, Harvard University, 2018

Course Assistant, Mathematics, Harvard University, 2014-2017

Publications

Picard LRB, Zhang JT, Cairncross WB, Wang K, Patenotte GE, Park AJ, Yu Y, Liu LR, Hood JD, Gonzalez-Ferez R, Ni KK. High resolution photoassociation spectroscopy of the excited c^3\Sigma_1^+ potential of NaCs. Physical Review Research 2023; 5:023149.

Wang K, Williams CP, Picard LRB, Yao NY, Ni KK. Enriching the quantum toolbox of ultracold molecules with Rydberg atoms. Physical Review X Quantum 2022; 3:030339.

Zhang JT, Picard LRB, Cairncross WB, Wang K, Yu Y, Fang F, Ni KK. An optical tweezer array of ground-state polar molecules. Quantum Science and Technology 2022; 7:035006.

Yu Y*, Wang K*, Hood JD, Picard LRB, Zhang JT, Cairncross WB, Hutson JM, Gonzalez-Ferez R, Rosenband T, Ni KK. Coherent optical creation of a single molecule. Physical Review X 2021; 11:031061.

Cairncross WB, Zhang JT, Picard LRB, Yu Y, Wang K, Ni KK. Assembly of a rovibrational ground state molecule in an optical tweezer. Physical Review Letters 2021; 126:123402.

Wang Y, Wang K, Fenton EF, Lin YW, Ni KK, Hood JD. Reduction of laser intensity noise over 1 MHz band for single atom trapping. Optics Express 2020; 28:21.

Hood JD, Yu Y, Lin YW, Zhang JT, Wang K, Liu LR, Gao B, Ni KK. Multichannel interactions of two atoms in an optical tweezer. Physical Review Research 2020; 2:023108.

Zhang JT, Yu Y, Cairncross WB, Wang K, Picard LRB, Hood JD, Lin YW, Hutson JM, Ni KK. Forming a single molecule by magnetoassociation in an optical tweezer. Physical Review Letters 2020; 124:253401.

Liu LR, Hood JD, Yu Y, Zhang JT, Wang K, Lin YW, Rosenband T, Ni KK. Molecular assembly of ground-state cooled single atoms. Physical Review X 2019 9:021039.

Drayna GK, Hallas C, Wang K, Domingos SR, Eibenberger S, Doyle JM, Patterson D. Direct time-domain observation of conformational relaxation in gas-phase cold collisions. Angewandte Chemie International Edition 2016; 55:16.

Presentations

Wang K, Wang Y, Cimmino R, Ni KK. A dual species optical tweezer array of Na and Cs atoms. Poster presentation, 55th Annual Meeting of the American Physical Society Division of Atomic, Molecular and Optical Physics, Fort Worth, TX, 2024.

Wang K, Fang F, Wang Y, Liu VS, Cimmino R, Wei J, Bintz M, Parr A, Kemp J, Ni KK, Yao N. Probing critical phenomena in open quantum systems using a Cs atom array. Oral presentation, 55th Annual Meeting of the American Physical Society Division of Atomic, Molecular and Optical Physics, Fort Worth, TX, 2024.

Wang K, Wang Y, Cimmino R, Fang F, Ni KK. Towards a dual-species optical tweezer array of Na and Cs atoms. Poster presentation, Gordon Research Conference on Precision Measurements, Quantum Science and Ultracold Phenomena in Atomic and Molecular Physics, Newport, RI, 2023.

Wang K. Towards a dual-species optical tweezer array of neutral atoms. Invited oral presentation, Columbia Programmable Quantum Materials seminar, virtual, 2022.

Wang K, Fang F, Wang Y, Cimmino R, Parr A, Yu Y, Ni KK. Towards a dual-species optical tweezer array

of neutral atoms. Oral presentation, 53rd Annual Meeting of the American Physical Society Division of Atomic, Molecular and Optical Physics, Orlando, FL, 2022.

Wang K, Yu Y, Hood JD, Picard LRB, Zhang J, Cairncross WB, Hutson JM, Gonzalez-Ferez R, Rosenband T, Ni KK. Coherent optical creation of a single molecule in an optical tweezer. Oral presentation, 52nd Annual Meeting of the American Physical Society Division of Atomic, Molecular and Optical Physics, virtual, 2021.

Wang K, Liu LR, Yu Y, Picard LRB, Hood JD, Rosenband T, Ni KK. Full quantum-state control of two different atoms in an optical tweezer. Poster presentation, 50th Annual Meeting of the American Physical Society Division of Atomic, Molecular and Optical Physics, Milwaukee, WI, 2019.

Wang K, Drayna G, Hallas C, Eibenberger S, Patterson D. Buffer-gas cooling of methyltrioxorhenium, a parity violation candidate precursor. Poster presentation, 47th Annual Meeting of the American Physical Society Division of Atomic, Molecular and Optical Physics, Providence, RI, 2016.

Peer Reviews

New Journal of Physics

Optics Express

Quantum Science and Technology