Assembling Optical Tweezer Arrays of Ultracold Molecules

J T Zhang[1,2], W B Cairncross[2,3], L R B Picard[1,2], Y C Yu[1,2], K Wang[1,2], and K-K Ni[1,2,3]

[1]*Department of Physics, Harvard University, Cambridge MA, USA*
[2]*MIT-Harvard Center for Ultracold Atoms, Cambridge MA, USA*
[3]*Department of Chemistry and Chemical Biology, Harvard University, Cambridge MA, USA*
Contact Email: jessiezhang@g.harvard.edu

Ultracold polar molecules, compared to their ultracold atom counterparts, possess rich internal structures and exhibit long-range dipole-dipole interactions that render them useful for many applications such as quantum simulation of matter, quantum computation and precision measurements. At the heart of many of these proposals is the ability to trap and control ultracold molecules at the individual particle level. In this talk, I will discuss how we assemble single molecules from ultracold atoms trapped in optical tweezers. This bottom-up approach utilizes laser cooling and trapping techniques of ultracold atoms and has enabled us to achieve full quantum state control on individually trapped molecules in an array. This opens up many exciting possibilities that can harness the rich properties of ultracold molecules.

References

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