Abstract Submitted
for the DAMOP19 Meeting of
The American Physical Society

State Dependent Collisions and Quantum Simulation with Tweezer Arrays of Ultracold Laser-cooled Molecules SEAN BURCHESKY, LOIC ANDEREGG, YICHENG BAO, LAWRENCE CHEUK, JOHN DOYLE, KANG-KUEN NI, Harvard University, WOLFGANG KETTERLE, Massachusetts Institute of Technology — Utilizing our recent optical array of single ultracold calcium mono-fluoride (CaF) molecules, we present ongoing work towards implementing internal state control of the molecules and tweezer merging to build a clean platform for collisional studies. We also present work towards dynamical tweezer rearrangement to deterministically create defect free arrays, which would be an ideal starting point for molecular qubits and quantum simulation of spin lattice Hamiltonians.

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Date submitted: 31 Jan 2019 Electronic form version 1.4