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Toward efficient YbLi molecule production in a 3d optical lattice[1]

KATHERINE MCCORMICK, ALAINA GREEN, JUN HUI SEE TOH, XINXIN TANG, SUBHADEEP GUPTA, University of Washington — Owing to their potential for tunable, long-range interactions and rich energy-level structure, ultracold molecules are promising platforms for quantum computing, simulation, and metrology. In contrast to many cold molecule experiments, which use bi-alkali systems where the ground state is $^1\Sigma$, the YbLi molecule has a $^2\Sigma$ ground state; this introduces an electronic spin degree of freedom, which could prove useful for quantum information applications or for studies of spin-controlled chemistry. After a comprehensive study of magnetic Feshbach resonances between Yb and Li [1], including their spin and temperature dependence, we are now well positioned to produce YbLi molecules through magnetoassociation. I will describe ongoing efforts to this end, including integrating a three-dimensional optical lattice and stabilizing the magnetic field.

[1] A. Green, et al., arXiv:1912.04874

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