

Abstract Submitted
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One-photon Assisted Formation of Ultracold LiH and NaH ELIZABETH JUARROS, University of Connecticut (Storrs, CT 06269), KATE KIRBY, Institute for Theoretical Atomic, Molecular, and Optical Physics (Cambridge, MA 02138), ROBIN CÔTÉ, University of Connecticut (Storrs, CT 06269) — Alkali hydride molecules have large dipole moments in their ground electronic states. We explore the possibility of forming such molecules from a mixture of the ultracold atomic gases, employing a one-photon stimulated radiative association process. Using accurate molecular potential energy curves and dipole moments, we have calculated the rate coefficients for populating each of the vibrational levels of the $X^1\Sigma^+$ state of LiH and NaH. We have found that significant molecule formation rates into the upper vibrational levels can be realized with laser intensities and MOT densities that are easily attainable experimentally. We examine the spontaneous emission cascade which takes place from these upper vibrational levels on a timescale of milliseconds, and calculate the resulting rotational populations in $v = 0$. We show that photon emission in the cascade process does not contribute to trap loss.

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