

Abstract Submitted  
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**Production and detection of ultracold LiRb molecules** SOURAV DUTTA, Raman Research Institute, Sadashivanagar, Bangalore 560080, India, ADEEL ALTAF, JOHN LORENZ, DANIEL S. ELLIOTT, YONG P. CHEN, Purdue University, West Lafayette, IN 47907, U.S.A. — We report on photoassociation (PA) of ultracold  ${}^7\text{Li}$  and  ${}^{85}\text{Rb}$  atoms and the production of ultracold heteronuclear  ${}^7\text{Li}{}^{85}\text{Rb}$  molecules in the electronic excited and ground states. The PA resonances are detected either using trap loss spectroscopy or by Resonance Enhanced Multi Photon Ionization (REMPI) of the ground-state LiRb molecules formed by spontaneous decay of the photoassociated excited state molecules. We identify several strong PA resonances below the Li ( $2s\ {}^2\text{S}_{1/2}$ ) + Rb ( $5p\ {}^2\text{P}_{1/2}$ ) and the Li ( $2s\ {}^2\text{S}_{1/2}$ ) + Rb ( $5p\ {}^2\text{P}_{3/2}$ ) asymptotes and experimentally determine the long range  $\text{C}_6$  dispersion coefficients. We find an excited-state molecule formation rate of  $3.5 \times 10^7\ \text{s}^{-1}$  and a PA rate coefficient of  $1.3 \times 10^{-10}\ \text{cm}^3/\text{s}$ , the highest among heteronuclear bi-alkali molecules. At large PA laser intensity, we observe the saturation of the PA rate coefficient close to the theoretical value at the unitarity limit. We will also present results on two-photon PA in LiRb.

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