



Formation of ultracold metastable RbCs molecules by short-range photoassociation

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Ultracold metastable RbCs molecules are observed in a double species MOT through photoassociation near the $\text{Rb}(5S_{1/2})+\text{Cs}(6P_{3/2})$ dissociation limit followed by radiative stabilization. The molecules are formed in their lowest triplet electronic state and are detected by resonant enhanced two-photon ionization through the previously unobserved ${}^3\Pi \leftarrow a^3\Sigma^+$ band. The large rotational structure of the observed photoassociation lines is assigned to the lowest vibrational levels of the $0^+, 0^-$ excited states correlated to the $\text{Rb}(5P_{1/2})+\text{Cs}(6S_{1/2})$ dissociation limit. This demonstrates the possibility to induce direct photoassociation in heteronuclear alkali-metal molecules at short internuclear distance, as pointed out in [J. Deiglmayr *et al.*, Phys. Rev. Lett. **101**, 13304 (2008)].

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