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Production of rovibronic ground-state ^{85}Rb^{133}Cs molecules via photoassociation to $\Omega = 1$ states TOSHIHIKO SHIMASAKI, Yale University, JIN TAE KIM, Yale University, Chosun University (Korea), DAVID DEMILLE, Yale University — We have extensively investigated short-range photoassociation (PA) to the $(2)^3\Pi_1$, $(2)^1\Pi_1$, and $(3)^3\Sigma_1^+$ states of ^{85}Rb^{133}Cs in the region between 11650 cm^{-1} and 12100 cm^{-1}, where strong mixing between triplet and singlet states is expected. In contrast to the previously observed two-photon cascade decay from the $(2)^3\Pi_0$ states [1], here we observe that the PA excited states can directly decay to the rovibronic ground state $X^1\Sigma^+(v = 0, J = 0)$ by a one-photon transition. We have observed rich hyperfine structures of the PA states, which were unresolved in previous cold beam experiments in the same region [2]. Based on the analysis of vibrational and rotational branching ratios in the decay process to the $X^1\Sigma^+$ state, we will discuss the molecule production rate in comparison with that for PA to the $(2)^3\Pi_0$ states. We will also report on a similar study of PA to the $B^1\Pi$ and $(2)^3\Sigma_1^+$ states of ^{85}Rb^{133}Cs, which also produce the rovibronic ground state $X^1\Sigma^+(v = 0, J = 0)$ via direct one-photon decay.

[1]T. Shimasaki *et al.* Phys. Rev. A, 91, 021401(R)(2015)
[2]Y. Lee *et al.* J. Phys. Chem. A, 112, 7214(2008)

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