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Stimulated Raman adiabatic passage with a rare-earth-ion-doped crystal HAYATO GOTO, KOUICHI ICHIMURA, Frontier Research Laboratory, Corporate Research & Development Center, Toshiba Corporation — We report experimental study of stimulated Raman adiabatic passage (STIRAP) with a rare-earth-ion-doped crystal ($\text{Pr}^{3+}:\text{Y}_2\text{SiO}_5$). We have investigated two types of STIRAP: Λ type and tripod type. We have demonstrated efficient population transfer between two ground states of Pr^{3+} ions in Y_2SiO_5 via Λ STIRAP. We have confirmed that the dependence of the efficiency of the population transfer on the delay time of the pulse sequence is in agreement with theoretical prediction. We have also experimentally investigated tripod STIRAP with $\text{Pr}^{3+}:\text{Y}_2\text{SiO}_5$. The observed population transfers and the comparison with numerical simulation in this case indicate that these are mainly due to a coherent process similar to STIRAP, not optical pumping.

Hayato Goto
Frontier Research Laboratory, Corporate Research & Development Center, Toshiba Corporation

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