Abstract Submitted
for the DAMOP09 Meeting of
The American Physical Society

Towards production of Bosonic ^{41}K^{87}Rb molecule in a 3-dimensional optical lattice JUN KOBAYASHI, The University of Tokyo, TETSUO KISHIMOTO, The University of Electro-Communications, KAI NODA, YOUSUKE FUJIKAKE, YOSHIYUKI YAMARIKU, The University of Tokyo, MASAHITO UEDA, SHIN INOUYE, The University of Tokyo and JST, ERATO
— One of the major goals in the field of ultracold gases is the production of ultracold polar molecules. Due to anisotropic, long range interaction, a polar molecular gas is expected to show us a rich variety of new phenomena, including anisotropic collapse and a super-solid phase. Last year, JILA group have successfully created a high-phase space density gas of Fermionic polar molecules ^{40}K^{87}Rb in the absolute ground state[1] Our goal is to explore a degenerate gas of Bosonic polar molecules. We prepare ultracold atomic gas mixture of ^{41}K and ^{87}Rb, and combine those atoms adiabatically to form molecules. Previously, we explored the basic properties of a gas of ^{41}K, producing a ^{41}K BEC of 3x10^5 atoms with a direct evaporation[2]. Here we report production of a quantum degenerate mixture of ^{87}Rb and ^{41}K atoms. This quantum degenerate mixture of atoms should be converted into Bosonic polar molecules in the absolute ground state via combination of Feshbach association and STIRAP performed in a 3D optical lattice. [1] K.-K. Ni et al., Science 322, 231 - 235 (2008) [2]T. Kishimoto et al., arXiv:0812.4335 (2008)

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Date submitted: 23 Jan 2009 Electronic form version 1.4