

replacing DAMOP16-2016-000209.

for the DAMOP16 Meeting of
The American Physical Society

BEC of ^{41}K in a Fermi sea of ^6Li ¹ RIANNE S. LOUS, ISABELLA FRITSCHKE, BO HUANG, MICHAEL JAG, MARKO CETINA, IQOQI Austrian Academy of Sciences and Inst. for Exp. Physics, Univ. of Innsbruck, JOOK T.M. WALRAVEN, Van der Waals- Zeeman Inst., Inst. of Physics, Univ. of Amsterdam and IQOQI Austrian Academy of Sciences, RUDOLF GRIMM, IQOQI Austrian Academy of Sciences and Inst. for Exp. Physics, Univ. of Innsbruck — We report on the production of a ^{41}K Bose-Einstein condensate (BEC) immersed in a degenerate two-component ^6Li Fermi sea. After evaporation in an optical dipole trap, we obtain 1.2×10^4 ^{41}K atoms with a 55% BEC fraction and a Fermi sea with $T/T_F < 0.1$, consisting of 1.8×10^5 ^6Li atoms in each of the lowest two spin states. This opens the way to study the collective behavior of a mass-imbalanced mixture of two coupled superfluids. The double-degenerate Fermi-Bose mixture also enables the study of interacting bosonic impurities in a Fermi sea. Using loss spectroscopy, we observe the 335.8 G Feshbach resonance, which is comparable to the one between ^6Li and the fermionic ^{40}K isotope exploited in our previous studies on the quantum many-body dynamics of fermionic impurities in a Fermi sea ². Investigating the interacting bosonic impurities enables the direct comparison of the role of quantum statistics for fermionic and bosonic impurities.

¹This work is supported by the Austrian Science Fund FWF within the collaborative research grant FoQuS.

²Cetina et al., Phys. Rev. Lett. **115**, 13502 (2015)

Rianne S. Lous
IQOQI Austrian Academy of Sciences and Inst. for Exp. Physics, Univ. of Innsbruck

Date submitted: 28 Jan 2016

Electronic form version 1.4