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**Triply degenerate quantum mixture of  $41\text{K}$ ,  $40\text{K}$  and  $6\text{Li}$** <sup>1</sup>  
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Atoms, and Research Laboratory of Electronics, MIT, Cambridge, Massachusetts  
02139, USA — We report the observation of a triply quantum degenerate mixture  
of  $^{41}\text{K}$ ,  $^{40}\text{K}$  and  $^6\text{Li}$  atoms. It is demonstrated that bosonic  $^{41}\text{K}$  atom is an efficient  
coolant for sympathetic cooling of fermionic  $^{40}\text{K}$  and  $^6\text{Li}$  atoms. We also present our  
investigation of  $^{41}\text{K}$  and  $^{40}\text{K}$ , a Bose-Fermi mixture where a 12 G s-wave resonance is  
observed. Negligible differential gravitational sag between potassium isotopes makes  
this resonance an excellent candidate for studying unexplored properties of Bose-  
Fermi mixtures. The  $^{40}\text{K}$  and  $^6\text{Li}$  mixture provides access to strongly correlated  
Fermi-Fermi mixtures with imbalanced masses.

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