Erratum: Improving the efficiency of ultracold dipolar molecule formation by first loading onto an optical lattice [Phys. Rev. A 81, 011605 (2010)]

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We have discovered an error in the calculated results in our article. The calculations have a trap for the K atoms but no trap for the Rb atoms. We have gone through and corrected the calculations to include the trap for the Rb atoms. In general, there are only minor changes, which are summarized in the new figures. The one notable change is that the inhomogeneous dynamical mean-field theory result now agrees much better with the quantum Monte Carlo (QMC) calculation, which provides strong evidence for the applicability of inhomogeneous dynamical mean-field theory (IDMFT) to this problem. Some other changes are that the shapes of the atom clouds at low temperature show less faceting than when there is no trap for the Rb atoms.

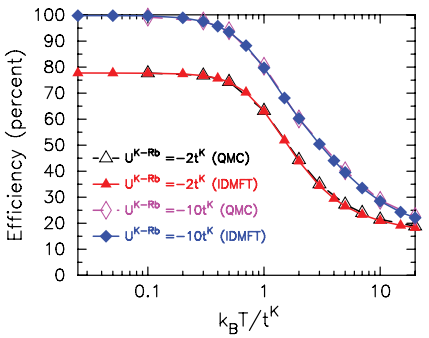

FIG. 1. (Color online) Efficiency for preforming molecules on the $15E_R^{\mathrm{Rb}}$ lattice for two different $U^{\mathrm{K-Rb}}$ interactions. Filled symbols are IDMFT and open symbols are QMC. $U^{\mathrm{K-Rb}}=-2t^{\mathrm{K}}$ and $-10t^{\mathrm{K}}$ correspond to $B=542.9$ G and 565.9 G, respectively. Note the excellent agreement between the two approaches.

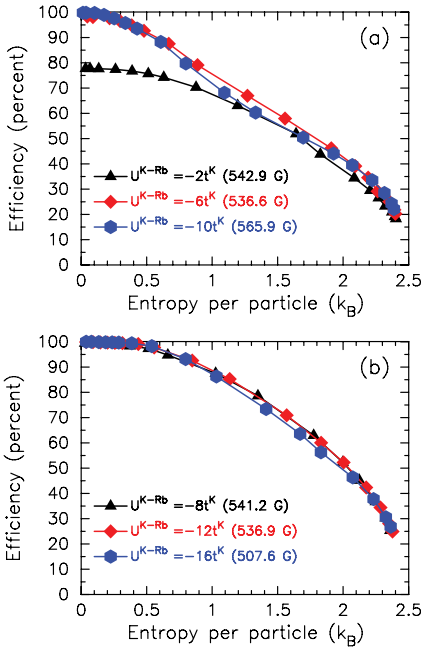

FIG. 2. (Color online) Efficiency for preforming molecules on the (a) $15E_R^{\mathrm{Rb}}$ and (b) $20E_R^{\mathrm{Rb}}$ lattices versus the entropy per particle, as calculated with IDMFT. The different symbols correspond to different K-Rb interaction strengths. The efficiency is nearly 100% at a sufficiently low entropy per particle, corresponding to low temperature, and for large enough K-Rb attraction.

The conclusions of our work are unchanged. However, the correction of our error shows that the heavy atom trap has only a weak effect. At high temperatures, its influence is dominated by our use of a relatively small box with hard wall boundary conditions. At low temperatures, the heavy atom trap is dominated by the preformed molecules causing atom pairs to lie on the same lattice site and be trapped by the light atom trap (Figs. 1–3).

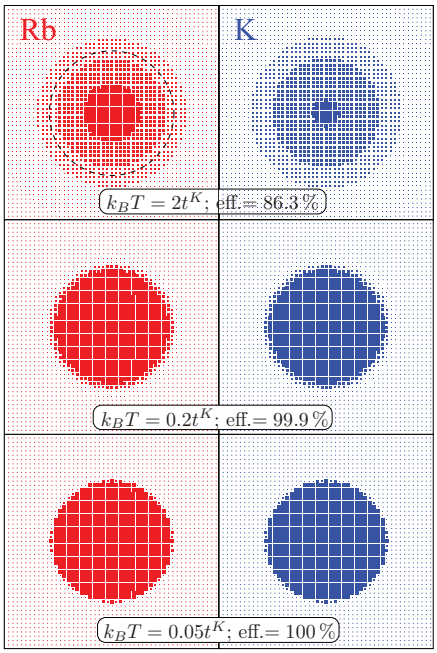

FIG. 3. (Color online) Density distributions for Rb (left) and K (right) atoms, at temperatures indicated on the plots along with the resulting efficiency of producing preformed molecules. Here, the lattice has a depth of $20E_R^{\mathrm{Rb}}$, and the interspecies attraction is $U^{\mathrm{K-Rb}} = -16t^{\mathrm{K}}$. The symbol size is proportional to the density on each lattice site. Sites inside the solid circle, at the center of the top left panel, show the lattice sites that have a double occupancy of Rb atoms more than 2% of the time.