

## **A single ion as a three-body reaction center in an ultracold atomic gas**

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We report on three-body recombination of a single trapped  $\text{Rb}^+$  ion and two neutral Rb atoms in an ultracold atom cloud. We observe that the corresponding rate coefficient  $K_3$  depends on collision energy and is about a factor of 1000 larger than for three colliding neutral Rb atoms. In the three-body recombination process large energies up to several 0.1eV are released leading to an ejection of the ion from the atom cloud. It is sympathetically recooled back into the cloud via elastic binary collisions with cold atoms. Further, we find that the final ionic product of the three-body processes is again an atomic  $\text{Rb}^+$  ion suggesting that the ion merely acts as a catalyzer, possibly in the formation of deeply bound  $\text{Rb}_2$  molecules.