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The role of electronic excitation in ultracold atom-ion chemistry[1]

SCOTT SULLIVAN, WADE RELLERGERT, University of California, Los Angeles, SVETLANA KOTOCHIGOVA, Temple University, ERIC HUDSON, University of California, Los Angeles — The role of electronic excitation in chemical reactions between ultracold Ca atoms and Ba^+ ions confined in a hybrid trap is studied. This prototypical system is energetically precluded from reacting in its ground state, allowing a particularly simple interpretation of the data. It is found that while electronic excitation of the ion can critically influence the chemical reaction rate, electronic excitation in the neutral atom is relatively unimportant. It is experimentally demonstrated that with the correct choice of the atom-ion pair it is possible to mitigate the unwanted effects of these chemical reactions in ultracold atom-ion environments, marking a crucial step towards the next generation of hybrid devices.

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