

Abstract Submitted  
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**Towards production of ultracold molecular ions in a hybrid trap system** SCOTT SULLIVAN, WADE RELLERGERT, KUANG CHEN, STEVEN SCHOWALTER, UCLA, SVETLANA KOTOCHIGOVA, Temple U., ERIC HUDSON, UCLA — We describe a new method for the production of ultracold molecular ions. This method utilizes sympathetic cooling due to the strong collisions between appropriately chosen molecular ions and laser-cooled neutral atoms to realize ultracold, internal ground-state molecular ions. In contrast to other experiments producing cold molecular ions, our proposed method efficiently cools both the internal and external molecular ion degrees of freedom. The availability of truly ultracold molecular ions will impact fields as diverse as quantum chemistry, precision measurement, and quantum information/computation. We report on direct evidence of ion-neutral interactions observed in the system.

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