

Abstract Submitted
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Control and manipulation of cold molecular ions SHIQIAN DING,
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Physics, National University of Singapore — Due to rich level structure, long trap-
ping time and good isolation from environment, molecular ions confined in an rf-Paul
trap are attractive for precision measurements and quantum information processing.
Translational degrees of freedom of the molecular ion can be sympathetically cooled
by laser-cooled atomic ions confined in the same trap. However control of an internal
molecular state remains a challenging problem. A frequency comb generated by a
mode-locked pulsed laser offers a tool to address ro-vibrational states of molecules
via simulated Raman transitions. Based on quantum logic techniques we present a
scheme for preparation, manipulation, and detection of internal states of molecular
ions and report progress towards its experimental implementation.

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