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Towards Trapping of Ba Ions for Heavy Molecule Spectroscopy JOAN MARLER, Northwestern University, J.H.V. NGUYEN, C-Y. LIEN, Y-W. LIN, V. RAJAGOPAL, C. SECK, D.A. TABOR, G. MCGLYNN, L. RUTH, B. ODOM — Precisely because of their rich internal structure, molecules are much more difficult to control than atoms. By laser-cooling co-trapped atomic ions, we intend to sympathetically cool molecular ions to milliKelvin temperatures, where velocities and environmental interactions are reduced. A possible scheme for further cooling to the rotational ground state of the molecule will be presented. Precision measurements on such molecules should shed light on slight difference in the vibrational levels of chiral molecules and possible changes in the fundamental constants.

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