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Low Temperature Chemistry with Trapped Ions JOAN MARLER, Clemson University — At temperatures 5 orders of magnitude less than room temperature individual ions and ensembles of ions can be studied and manipulated with an unprecedented level of control. To achieve these temperatures ions are isolated in an rf-trap and laser-cooled to temperatures in which their internal states can be measured, set and switched at the individual ion level. Since the earliest days of ion trapping, scientists have appropriated these traps to perform experiments in fields as diverse as fundamental particle physics, anti-matter science, quantum information science, condensed matter, and chemistry. At Clemson near term experiments include following state to state chemical reactions, studying chemistry relevant to astrophysical systems and performing highly accurate measurements of carbon containing organic systems. Additional experiments will explore beyond the standard model physics using Highly Charged Ions (HCIs) from the Clemson EBIT which have been subsequently trapped in an ion trap.

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