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Abstract for an Invited Paper
for the DAMOP18 Meeting of
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Cold Chemistry with Cold Molecules

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I will discuss our efforts towards reaching ultra-cold temperatures with trapped molecules where molecular beams carrying both cold molecules and atoms have been decelerated and trapped in a permanent magnetic trap. I will present our plans and prospects of further cooling via evaporation or collisions with laser cooled atoms. In the second part of my talk I will focus on cold collisions with cold molecular partners that have been magnetically merged in order to reach collisions temperatures of 10 mK. I will show that quantum phenomena dominates collisions in this cold regime and discuss the importance of molecular degrees of freedom on cold reactions. I will present our latest results where low energy collisions have been imaged using the Velocity Map Imaging technique allowing us to observe rotational quantum state selective inelastic scattering as well as diffraction oscillations that occur in cold elastic collisions.