LOW TEMPERATURE CHEMICAL REACTOR

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A new approach for production of very cold molecules is described. This includes an experimental system for producing and observing $Cs^* + H_2 \rightarrow CsH + H$ chemical reactions below 10 K. The ground state Cs atoms are trapped and cooled down to few hundred microKelvin in a standard magneto-optical trap (MOT), and then excited to the $7P_{1/2}$ or $7P_{3/2}$ state. A cold para H_2 beam (up to 10 K) collides with Cs^* atoms. Due to the reaction energetics, the CsH molecules produced by the $7P_{1/2}$ reaction must be in the lowest rovibrational state. Detection techniques to be employed include LIF and REMPI.