Abstract Submitted
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Stimulated cooling of molecules on multiple rovibrational transitions with coherent pulse trains[1] EKATERINA ILINOVA, JONATHAN D. WEINSTEIN, ANDREI DEREVIANKO, Physics Department, University of Nevada, J.D. WEINSTEIN RESEARCH GROUP, EXPERIMENTAL ATOMIC, MOLECULAR, & OPTICAL PHYSICS TEAM, A. DEREVIANKO RESEARCH GROUP, THEORETICAL ATOMIC PHYSICS TEAM — We propose a method of stimulated laser cooling of diatomic molecules by counter-propagating π-trains of ultrashort laser pulses. The cooling cycles occur on the rovibrational transitions inside the same ground electronic manifold, thus avoiding the common problem of radiative branching in Doppler cooling of molecules. By matching the frequency comb spectrum of the pulse trains to spectrum of the R-branch rovibrational transitions we show that stimulated cooling can be carried out on several rovibrational transitions simultaneously, thereby increasing number of cooled molecules. The exerted optical force does not rely on the decay rates in a system and can be orders of magnitude larger than the typical values of scattering force obtained in conventional Doppler laser cooling schemes. http://arxiv.org/pdf/1201.1015.pdf

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