OPTICAL PULSE-SHAPING FOR INTERNAL COOLING OF MOLECULAR IONS

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We propose a scheme to use pulse-shaped femtosecond lasers to optically cool the internal degrees of freedom of molecular ions. Since this approach relies on cooling rotational and vibrational quanta by exciting an electronic transition, it is most straightforward for molecular ions with diagonal Frank-Condon-Factors. The scheme has the advantage of requiring only tens of microseconds to reach equilibrium without blackbody radiation to redistribute the population. For AlH^+, a candidate species, a rate equation simulation shows equilibrium is achieved in 15 μs.