Collisional cooling of ultra-cold atom ensembles LUDWIG MATHEY, NIST, Gaithersburg, and JQI, UMD, EITE TIESINGA, NIST, Gaithersburg, PAUL JULIENNE, NIST, Gaithersburg, CHARLES CLARK, NIST, Gaithersburg — We study a new cooling mechanism, collisional cooling, which capitalizes on the energy selectivity of inelastic scattering in a Feshbach resonance. We study this mechanism by simulating an ensemble of fermionic atoms in the quantum degenerate regime in the presence of such a resonance via a quantum kinetic approach. We find that by tuning the resonance energy appropriately, the temperature of the system can be lowered to a temperature comparable to the width of the resonance, and that thermalization is achieved through elastic scattering, which is also strongly enhanced due to the presence of the resonance.

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