

Stochastic Cooling of Atoms using Lasers

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We propose a new method to laser-cool atoms based on stochastic cooling, first developed at CERN to cool anti-protons. Fluctuations in the momentum distribution will be detected in a pump-probe configuration with far-detuned lasers, and the appropriate correction kick will be accomplished with optical dipole potentials. Each stage of an iterative cooling process will involve measurement and feedback, with phase space re-mixing in between. This method can lead to a compression of phase space without spontaneous emission cycles, and may be applied to magnetically trapped atoms and molecules.