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Can one cool faster?

Subrecoil laser cooling is a method of choice for cooling low density gases down to the nanokelvin range. It rests on an anomalous momentum random walk with an infinite mean lifetime trap (Levy flight). Recently, a mechanism called "narrow line cooling" has been experimentally demonstrated in several laboratories. The obtained temperatures are limited by the slow, power law, dynamics of the cooling process. In this talk, we will investigate whether the statistical properties of the momentum random walk can be tuned to obtain "optimally" fast cooling exponents (joint work with E. Bertin)