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**Cooling of Atoms Using an Asymmetric One-Way Barrier** ARTEM DUDAREV, MICHAEL MARDER, Center for Nonlinear Dynamics - The University of Texas, Austin, TX 78712-1081; Department of Physics - The University of Texas, Austin, TX 78712-1081, QIAN NIU, Department of Physics - The University of Texas, Austin, TX 78712-1081, NATHANIEL FISCH, Princeton Plasma Physics Laboratory - Princeton University, Princeton, NJ 08543, MARK RAIZEN, Center for Nonlinear Dynamics - The University of Texas, Austin, TX 78712-1081; Department of Physics - The University of Texas, Austin, TX 78712-1081 — We show how to construct asymmetric optical barriers for atoms. These barriers can be used to compress phase space of a sample by creating a confined region in space where atoms can accumulate with heating at the single photon recoil level. We describe how the wall can be created with a simple two-level model and then show how it can be applied to more realistic multi-level atoms. The phase space compression is illustrated in two regimes: (i) when the wall is placed in the middle of a box potential and atoms are collected in the smaller region; (ii) when it is moved in the concave potential with a finite velocity. In both cases we derive analytical expression for compression and compare them with numerical simulations of collisonless gas.

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