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Abstract for an Invited Paper
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A quantum Newton's cradle[1]

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I will describe experiments with highly non-equilibrium one-dimensional (1D) Bose gases. We first prepare arrays of trapped 1D Bose gases. We then set many of the atoms oscillating with four recoil energies. This initial condition is reminiscent of a Newton's cradle, the popular momentum demonstration. We watch these distributions evolve, and observe that they do not reach equilibrium even after each atom has undergone thousands of collisions. In contrast, similarly energetic 3D gases thermalize after only a few collisions. Our result holds in both the Tonks-Girardeau and the intermediate 1D coupling regimes. When tunneling is allowed among the1D arrays, the collisional character ceases to be strictly 1D. I will describe our observations of the ensuing thermalization.

[1]This work was performed in collaboration with Trevor Wenger and David S. Weiss.