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**Damping of Dipole Oscillations of a Bose-Einstein Condensate in a Random Potential**[1] D. DRIES, S.E. POLLACK, J. HITCHCOCK, R.G. HULET, Department of Physics and Astronomy and Rice Quantum Institute, Rice University, Houston, TX 77005 — Due to their exquisite controllability, atomic BECs in optical speckle potentials provide unique opportunities to study the interplay of disorder and atomic interactions in a superfluid. We report on the effects of disorder on the collective dipole motion of a BEC of $^7$Li in an optical trap. We observe damping that depends on condensate center of mass velocity $v$, resulting in a non-exponential decay of the oscillation amplitude vs. time. We map out the phase diagram for the damping of the dipole mode as a function of both disorder strength and $v$. The damping peaks at $v \sim c$, where $c$ is the peak speed of sound in the BEC, while for both $v \gg c$ and $v \ll c$, the damping rate tends to zero. By exploiting the extreme tunability of the atomic interactions in $^7$Li, we investigate damping in the regime of weak interactions where $c \to 0$.

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