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Many-body dynamics of a BEC quenched to unitarity JOHN CORSON, ANDREW SYKES, JOSE D'INCAO, ANDREW KOLLER, JILA, NIST, and the University of Colorado, Boulder, CHRIS GREENE, Purdue University, ANA MARIA REY, KADEN HAZZARD, JOHN BOHN, JILA, NIST, and the University of Colorado, Boulder — The dynamics of a dilute BEC quenched to unitarity are studied using a variational ansatz for the many-body quantum state. Despite the resonant atom-atom interactions, the condensate does not deplete instantaneously, and this allows for a self-consistent mean-field-like description of the system at short (but experimentally-accessible) times. At infinite scattering length and zero temperature, the dynamics are found to scale universally with the number density, as reported in the experiment of Makotyn et al, arXiv1308.3696. We predict the time evolution of observables such as the momentum distribution $n_k(t)$, the contact $C(t)$, and the density $n_m(t)$ of Feshbach molecules generated by the interaction quench. We observe a saturation of large-momentum populations on a time scale that is consistent with recent measurements.

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