Abstract Submitted
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Controlling the condensate in driven optical lattices ALBERTO NOCERA, ADRIAN FEIGUIN, Department of Physics, Northeastern University, Boston, Massachusetts 02115, USA — We study the one-dimensional attractive Hubbard model under the influence of a periodic driving potential with the time-dependent density matrix renormalization group showing that the system can be driven in an unconventional paired state characterized by a condensate made of Cooper-pairs with a finite center-of-mass momentum similar to a Fulde-Ferrell state. We obtain results both in the laboratory and the rotating reference frames demonstrating that the momentum of the condensate can be finely tuned by changing the ratio between the amplitude and the frequency of the driving. In particular, by quenching the above ratio to the value giving suppression of the tunneling and putting the Coulomb interaction strength to zero, we are able to "freeze" the condensate. We finally study the effects of different initial conditions, and compare our numerical results to those obtained from a time-independent Floquet theory in the large frequency regime. Our work offers the possibility of engineering and controlling unconventional paired states in fermionic condensates.

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