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Self-organization of atoms coupled to a chiral reservoir ZACHARY ELDREDGE, Univ of Maryland-College Park, DARRICK CHANG, ICFO, Barcelona, ALEXEY GORSHKOV, Univ of Maryland-College Park — Recently, there has been increasing interest in the properties of confined light in the vicinity of tapered optical nanofibers. Interesting avenues have been suggested concerning cold atoms trapped on the fiber by evanescent light fields. It has been shown that the interaction between atoms coupled to this one-dimensional reservoir leads to equations of motion possessing self-organized stable solutions which exhibit striking many-body dynamics. Finally, it has also been observed that spin-orbit coupling due to the extreme confinement of the light leads to a directionality in the coupling to the fiber. In this paper we explore the implications of a chiral interaction on self-organization and show that the overall configuration exhibits similar behavior to the symmetric case but undergoes dramatic changes in some regions of parameter space. We also present proposals for experimental realizations of our model as well as signatures of chiral behavior.

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