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Particle-hole symmetric localization in optical lattices using time modulated random on-site potentials YUE ZOU, California Institute of Technology, RYAN BARNETT, University of Maryland, GIL REFAEL, California Institute of Technology — For ultra-cold atoms in optical lattices, periodically driven potentials provide a novel way to tune the model parameters. Well-studied examples include the so-called "dynamical localization" phenomenon, where a uniform periodically modulating potential effectively reduces the hopping strength, which can be used to tune a condensate through the superfluid-insulator-transition or to observe photon-assisted tunneling of a condensate. Here we propose a novel application of the periodically driven potential: with disordered on-site potential and weak uniform hopping amplitude, one can tune a non-interacting system from an Anderson insulator to a random hopping model with diverging localization length at the band center, and eventually to a uniform-hopping tight-binding model if the oscillation frequency of the potential energy is gradually increased from zero to infinity. Detailed study of the one-dimensional case will be reported.

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