Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Non-equilibrium bosonic transport through local manipulations in closed and open quantum systems CHEN-YEN LAI, CHIH-CHUN CHIEN, Univ of California - Merced — In cold atom systems, driving neutral atom through the system by using particle reservoir can be a challenging task. Here, we address an issue on tuning local potentials dynamically as controllable particle source and sink. In equilibrium, a deep potential can collect many bosons locally as a faithful sink, which indicates the usefulness in adiabatic limit. However, the sudden quenched of local potential shows low efficiency of attracting bosons into it, and this lack of efficiency is a consequence of the energy conservation in the isolated systems. Under different interactions and quenched potential depth, an averse response is observed where a deeper quenched potential results in less bosons in the sink. By considering additional reservoir, the system-environment couplings extend the theoretical description to open quantum systems. Several system-environment couplings are discussed, and we found a Lindblad operator corresponding to local cooling processes which can significantly improve the effectiveness of the dynamical emerged sink. (arXiv:1609.00468 to be appeared in Sci. Rep.)

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Date submitted: 07 Nov 2016 Electronic form version 1.4