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Correlation dynamics and lattice modulation spectroscopy of interacting one dimensional systems

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Quench and lattice modulation are powerful tools for probing low-energy excitations of interacting many-body systems. We present a study of correlation dynamics and absorbed energy power of one-dimensional interacting systems (fermionic and bosonic) subjected either to a quench or to a periodic drive of the optical lattice. For these Tomonaga-Luttinger liquids we find a universal scaling of the absorbed power determined by the boundaries of the system. In the case of an additional ionic staggered potential it is shown how the lattice spectroscopy approach reveals characteristics of a bond order wave phase. Our results can be readily demonstrated in ultracold atoms in optical lattices with current experimental technology.

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