Extended unitarity and absence of skin effect in periodically driven systems

Aditi Chakrabarty
NIT, Rourkela

One of the most striking features of non-Hermitian quasiperiodic systems with arbitrarily small asymmetry in the hopping amplitudes and open boundaries is the accumulation of all the bulk eigenstates at one of the edges of the system, termed in literature as the skin effect, below a critical strength of the potential. In this work, we uncover that a time-periodic drive in such systems can eliminate the SE up to a finite strength of this asymmetry. Remarkably, the critical value for the onset of SE is independent of the driving frequency and approaches to the static behavior in the thermodynamic limit. We find that the absence of SE is intricately linked to the emergence of extended unitarity in the delocalized phase, providing dynamical stability to the system. Interestingly, under periodic boundary condition, our non-Hermitian system can be mapped to a Hermitian analogue in the large driving frequency limit that leads to the extended unitarity irrespective of the hopping asymmetry and the strength of the quasiperiodic potential, in stark contrast to the static limit. Additionally, we numerically verify that this behavior persists Based on our findings, we propose a possible experimental realization of our driven system, which could be used as a switch to control the light funneling mechanism.