We thank the referee for the careful reading of our manuscript and finding the second version of the paper to be significantly improved.

I. STRENGTHS

1. Very well written
2. Nice combination of analytical and numerical work

   We again thank the referee for finding our paper well-written and interesting with a combination of detailed analytical and numerical analysis.

II. WEAKNESSES

1. Results potentially only valid in high frequency regime.

   Please see the section below for the detailed response to this question.

2. Insufficient pixel resolution of figures.

   We have improved the pixel resolution in this version of the manuscript. We hope that the modified figures in the revised manuscript satisfactorily address the referee's concerns about the quality of the pixel resolution.

III. REPORT

Referee's comments: The authors have carefully addressed all comments by the referees and significantly improved and extended the paper. One major claim of the paper is the stability of dynamical localization in the presence of interactions and the authors have added an analysis as a function of system size in Sec. 5. Unfortunately, this analysis was only carried out in the high frequency regime ($\omega = 20$) and it remains unclear whether the discussed phenomena are stable in the thermodynamic limit. It is well known in Floquet many-body systems that for fixed driving frequency, most systems become ergodic in the limit of large system sizes. This limit is, however, not reachable in practice for high frequencies of the drive. From Fig. 22, I would conclude that the results are very far from the thermodynamic limit, because the density of states is still strongly peaked on the unit circle. However, there are some slight indications in the $L = 20$ results in Fig 22. c), that at the edge of the quasienergy spectrum an interference between states at high and low quasienergy starts to take place, ”bending up” the entanglement curve. I suspect that in the limit of larger sizes (or, much easier to analyze, at lower driving frequency), the density of states will become flat and potentially the system will be ergodic. Only in this limit, if the system indeed escapes ergodicity as the authors claim, will the results be convincing in all claimed generality.

This being said, the results and discussion stand on their own and are of course valid at the analyzed system sizes and driving frequencies. It would be good to explicitly say that the results apply for fast driving, though.

In summary, I can recommend this paper for publication in SciPost Physics Core. I cannot recommend publication in SciPost Physics, because of the remaining doubts on the generality of the results in the thermodynamic limit as explained above. This concern prevents fulfilling the acceptance criteria of SciPost Physics.

Our responses: We appreciate the referee's concern regarding the stability of HSF in the low driving frequency regime. In the revised version of the manuscript, we discuss a prescription for stabilizing the HSF in the low-frequency regime by considering the dynamical localization (DL) points and resonances occurring at $\mu = V = n\omega$, where n is odd and takes progressively larger values. Our analytical and numerical analysis indicates that HSF is quite stable even in the low-frequency regime by choosing the other DL points ($n = 3, 5, 7, 9, \cdots$) provided that the amplitude of driving and the strength of interaction are strong enough to stabilize HSF. We further analyze the entanglement spectrum for $L = 12,\ 16,\ 18$ to check the stability of HSF in the low-frequency regime in the thermodynamic limit. Our investigation indicates that the low-entanglement states are quite stable with increasing system sizes. Therefore, one can conclude that the HSF mechanism for breaking ergodicity in our model is applicable in a broad range of driving frequencies. Moreover, it protects the system from heating even in a comparatively lower frequency regime, which is otherwise impossible to achieve without this intricate interplay between the dynamical localization, interaction and resonances in this class of models. We hope that this newly added analysis will satisfactorily resolve the referee's concerns regarding to the generality of the results in our model.

IV. REQUESTED CHANGES

1. The pixel resolution of the figures has been improved in the revised manuscript. All the figures are now in pdf format as requested by the Editor.
2. To understand HSF in the intermediate and lower frequency regimes, we have examined the period-2 model both analytically and numerically by considering the other DL points at the resonance condition. We have included Figs. 8 and 9 in the revised version of the manuscript, where the entanglement spectrum and the dynamics of Loschmidt echo are investigated in the intermediate and lower frequency regimes.
3. We have added Fig. 12 showing the results for different system sizes to confirm the thermodynamic stability of the low-entanglement states in the lower frequency regime. This implies non-ergodic behavior of the system in the lower frequency regime.
4. We have added Fig. 13 in the revised manuscript showing two ergodic to non-ergodic crossovers in terms of the half-chain entanglement entropy at the 2000-th stroboscopic number as a function of the driving amplitude occurring in the high-frequency and low to intermediate frequency regimes at the first and ninth dynamical localization points with resonances, respectively.