Routes to maximize the lifetime of discrete time crystals[1] SAYAN
CHOUDHURY, QI ZHOU, Purdue University — Motivated by the recent observa-
tion of time crystals in the absence of disorder, we propose schemes to extend the
lifetime of a discrete time crystal in a translation invariant Ising spin chain. We de-
rive an analytical framework to show that by appropriately tuning the interactions,
it is always possible to observe time crystal signatures in a finite size chain. We also
obtain an expression for the optimal value of the Ising interaction that maximizes
the lifetime of the time crystal. Our results hold for both short and long range
interacting systems. Furthermore, we find that in the thermodynamic limit, only an
infinite range interaction can lead to a time crystal in the absence of disorder. Our
work elucidates the crucial role of interactions in realizing a time crystal.

[1]Purdue University

Sayan Choudhury
Cornell University