

## Higher-order Interaction Induced Chimeralike State in a Bipartite Network

Contributed  
Talk

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We report higher-order coupling induced stable chimera-like state in a bipartite network of coupled phase oscillators without any time-delay in the coupling. We show that the higher-order interaction breaks the symmetry of the homogeneous synchronized state to facilitate the manifestation of symmetry breaking chimera-like state. In particular, such symmetry breaking manifests only when the pairwise interaction is attractive and higher-order interaction is repulsive, and vice versa. Further, we also demonstrate the increased degree of heterogeneity promotes homogeneous symmetric states in the phase diagram by suppressing the asymmetric chimera-like state. We deduce the low-dimensional evolution equations for the macroscopic order parameters using Ott-Antonsen ansatz and obtain the bifurcation curves from them using the software XPPAUT, which agrees very well with the simulation results. We also deduce the analytical stability conditions for the incoherent state, in-phase and out-of-phase synchronized states, which match with the bifurcation curves.

### References

- [1] Rumi Kar, V. K. Chandrasekar, and D. V. Senthilkumar, Higher-order interaction induced chimeralike state in a bipartite network, *Phys. Rev. E* 110, 034205(1-10) (2024).