Collective Dynamics of Non-Isochronous Stuart-Landau Oscillators: Interplay of Asymmetric and Symmetric Couplings

Contributed Talk

Thounaojam Umeshkanta Singh

Department of Physics, Bennett University, Greater Noida, Uttar Pradesh, India

I will present the collective dynamics and phase transitions of identical Stuart-Landau oscillators on a ring network with asymmetric and symmetric couplings in this talk. The system exhibits a wide variety of dynamical behaviours, including (i) complete synchronization, (ii) travelling waves, (iii) splay states, and (iv) quenched oscillations. I will examine the dynamical and topological factors that produce these different patterns. Lastly, I will highlight some potential applications of these collective phenomena and phase transitions of the limit-cycle oscillators.

References

[1] Naveen Kumar Mendola and Thounaojam Umeshkanta Singh, Collective dynamics and phase transitions of the Stuart-Landau oscillators on a ring: Interplay of asymmetric and symmetric couplings, Phys. Rev. E (2024) Under revision.

[2] Naveen Kumar Mendola and Thounaojam Umeshkanta Singh, Collective rotation-flips and explosive synchronization in a ring of limit cycle oscillators, Chaos Solitons Fractals **180**, 114588 (2024).

[3] Thounaojam Umeshkanta Singh, Explosive synchronization in bipartite networks, Chaos Solitons Fractals **152**, 111435 (2021).