

Self-Emerging and Turbulent Chimeras in Oscillator Chains

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We report on a self-emerging chimera state in a homogeneous chain of nonlocally and nonlinearly coupled oscillators. This chimera, i.e. a state with coexisting regions of complete and partial synchrony, emerges via a supercritical bifurcation from a homogeneous state and thus does not require preparation of special initial conditions. We develop a theory of chimera basing on the equations for the local complex order parameter in the Ott-Antonsen approximation. Applying a numerical linear stability analysis, we also describe the instability of the chimera and transition to a phase turbulence with persistent patches of synchrony.

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