* Electronic Address: Felix.Kemeth@tum.de
† Electronic Address: Sindre.Haugland@tum.de
‡ Electronic Address: Lennart.Schmidt@mytum.de
[1] Physics Department, Technical University of Munich
§ Electronic Address: Yannis@princeton.edu
[2] Princeton University and IAS Munich
¶ Electronic Address: krischer@tum.de

From a classification scheme for chimera states to novel coexistence patterns in isotropic oscillatory media

Felix Kemeth[1*], Sindre Haugland[1†], Lennart Schmidt[1‡], Yannis Kevrekidis[2§], Katharina Krischer[1¶]

Chimera states, the counterintuitive coexistence of synchronized and desynchronized regions in an otherwise isotropic system, have received considerable interest during the last decade. Meanwhile, many different chimera states have been reported in experiment and theories of different mechanisms leading to their emergence are known. In the talk, I will first present a universal characterization scheme for chimera states applicable to both numerical and experimental data sets. The scheme is based on two correlation measures that enable a meaningful definition of chimera states as well as their classification into three categories: stationary, turbulent and breathing. In addition, the categories can be further subdivided according to the time-stationarity of these two measures. In the second part of the talk I will present experiments and simulations that suggest that chimera states are just one realization of a multitude of related coexistence patterns, showing a similar level of seemingly contradictory behavior in the coexisting regions. In a wider sense, the coexistence of such disparate patterns can be seen as diversification of the dynamical behavior of a system with uniform parameters.