

Jamir MARINO, Mainz University, Germany

‘Dissipative phase diagram of a periodically driven quantum many-body optics platform’

I will present the dynamical phase diagram resulting from the interplay of periodically driven light-matter interactions, photon losses, and perturbations which explicitly break the mean-field solvability of the conventional Dicke model. Such diagram comprises a rich set of dynamical responses including long-lived and metastable Dicke time crystals, where losses can cool down the many-body heating resulting from the continuous pump of energy from the periodic drive. Specifically, when integrability breaking interactions are ferromagnetic, we observe time crystalline behavior at non-perturbative values of the coupling strength, suggesting the possible existence of stable dynamical order in a driven-dissipative quantum many-body system. I will also briefly mention perspectives for realizing quadruple-period dynamical responses with inhomogeneous light-matter couplings in quantum optics.