Abstract: Parity and time-reversal (PT) systems are open systems with balanced gain and loss. Their dynamics are described by an effective non-Hermitian Hamiltonian, and they undergo PT breaking transition when the strength of the gain-loss term exceeds a threshold. This transition is also observed in purely dissipative systems with localized losses, and is driven primarily by the non-Hermitian degeneracies that are fundamentally different from level crossing in Hermitian systems. After reviewing the history of PT-symmetric quantum theory led by Carl Bender, I will describe properties of such systems in the Floquet domain in classical and quantum settings, and show experimental results that support the theoretical modeling.