ICFO

INSIGHT SEMINAR: Harnessing collective dissipation for quantum metrology and many-body entanglement

AASHISH CLERK

April 16, 2026
12:00 to 13:00
Elements Room

Non-unitary evolution from structured dissipation is a powerful resource for quantum information processing, but "reservoir engineering" schemes applied to many-body systems are often experimentally intractable. Here I focus instead on a simple and ubiquitous form of dissipation: fully collective loss acting on spins, atoms, or oscillators. With minimal additional Hamiltonian terms, this generic loss mechanism can stabilize a wide variety of highly entangled states that are both practically useful (e.g., for non-local quantum metrology) and theoretically interesting (e.g., states with symmetry-protected topological order). Collectiv loss also underlies the phenomenon of superradiance. I'll discuss a previously unexplore

aspect of this physics: what is the information content of the emitted photonic burst, and ca this information be accessed with simple measurements? The answer points to a new readou strategy for spin-based quantum metrology protocols.

Hosted by: Prof. Dr. Darrick Chang and Prof. Dr. Adrian Bachtold