

Research Directions

- (a) physics of quantum computing in specific devices: superconducting qubits, photonics, atoms and ions in cold traps
- (b) quantum error correction by realistic physical devices, quantum error correction in hardware (topological protection, GKP states, etc)
- (c) quantum many-body physics and its connections with quantum information theory
- (d) driven dynamics of closed quantum system (circuits), highly non-equilibrium quantum problems
- (e) quantum simulators (analogue devices)
- (j) photonics and non-linear optics: photonic crystals, nanoplasmonics, quantum photonic integrated circuits, single photon emitters
- (f) physics of quantum nanostructures: quantum dots and wires, superconducting junctions with semiconductors and ferromagnets
- (g) new quantum materials: topological insulators and superconductors, Weyl metals, graphene and layered dichalcogenides
- (h) nanoelectronics: photovoltaic elements, single photon detectors, terahertz detectors, SQUID detectors, single-electron detectors
- (i) fast superconducting devices: bolometers, microcoolers, superinductors
- (j) cryomemory devices based on electronic crystals