

Ch 1. Quantum Physics

- Classical mechanics vs. Quantum mechanics
 - Newton's laws
 - Electromagnetism
 - Force-based: mass and energy
 - macroscopic
 - deterministic
 - local
 - causality (cause-effect relation)
 - separable correlation
 - Maxwell's eqs.
 - Schrödinger's equations
 - Quantization
 - microscopic
 - probabilistic (superposition) (indeterministic)
 - nonlocal
 - violation of causality
 - inseparable correlation
 - Quantum field theory

- Information theory vs. Entropy (Von Neumann)

$$S = - \sum_j p_j \ln p_j$$

Quantum Information technologies

Quantum Computer


Quantum cryptography / communications

Quantum Sensing

- Quantum Superposition
- Quantum Entanglement
- Quantum Correlation (nonlocal)
- Quantum Measurements

- Which one is real btw electron and fields?

- Quantum field theory (Dirac in 1927)

→ elementary entity that make up the physical universe.  Springer glory