Quantum Physics Summary

Based on the Course Quantum Physics for Non-Physicists

Contents

Dirac Notation

Rules of Quantum Mechanics

States

The state space is a Hilbert space:

- Complex vector space
- Posesses an inner product

Finite Dimensions

Example

A qubit lives in the space spanned by the basis $\{|0\rangle, |1\rangle\}$.

Infinite Dimensions

$$|\psi\rangle = \int_{-\infty}^{\infty} \psi(x) |x\rangle \, dx$$

Measurements

Measurements can be represented via projectors:

$$\mathcal{M} = \{P_0, \ldots, P_n\} \quad P_i^2 = P_i \quad \sum_i P_i = 1$$

Dirac Notation

Evolution

Reversible Evolution