# Bra-ket notation

The bra-ket notation, also called Dirac notation, is designed to make some operations of quantum mechanics easier. The notation uses angle brackets to denote vectors in a complex Hilbert space.

A **ket** is written as $|\psi\rangle$ and represents a column vector (state vector), while a **bra**, written as $\langle\phi|$ represents the conjugate transpose (row vector) of a ket.

The inner product (overlap) between two states is written as

$$\langle\phi|\psi\rangle,$$

and in quantum mechanics this expression is interpreted as the probability amplitude for a state $\phi$ to collapse onto $\psi$ (the state $\phi$ is projected onto the state $\psi$).

The outer product, which forms an operator, is written as:

$$|\psi\rangle\langle\phi|.$$