Lecture 19

Quantum measurement

Measurement of observable → one of its eigenvalues
Immediately afterwards, system is in corresponding eigenstate
Information in original superposition of states has been destroyed

Entanglement

Two systems are entangled if quantum states are not independent
– results of measurements on one depend on results for the other
Unentangled state: product of states of 1 and 2

$$\psi_{11}(1,2) = \alpha(1)\,\alpha(2)$$

Entangled state: cannot be written as a product

$$\psi_{00}(1,2) = \frac{1}{\sqrt{2}}\Big(\alpha(1)\,\beta(2) - \beta(1)\,\alpha(2)\Big)$$