

The EPR(Einstein-Podolsky-Rosen) pair is a particular case of entangled pair of qubits. Entangled particles are the particles that remain connected so that actions performed on one affect the other, even when separated by great distances. In 1935, the three scientists, Einstein, Podolsky and Rosen, argued that quantum mechanics was incomplete. Their argument was, imagine two entangled particles at a great distance from each other, and each of the particles is with an observer. If the observer at the first particle measures its position, we can determine the position of the second particle using conservation of relative position. And in the same way, if the observer at the second particle measures its momentum, we can determine the momentum of the first particle using conservation of momentum. This clearly violates Heisenberg's Uncertainty Principle. This is popularly called as the EPR Paradox. Hence, the three scientists, said quantum mechanics was incomplete and there were more hidden variables that had to be included in the mathematical expressions. It was later proved by John Bell, that quantum mechanics theory and the hidden variables theory cannot be simultaneous and supplementary.