L3 - QIC

$[X, p]=ih/2\pi$
$XP - PX \neq 0$

Heisenberg: Matrix mechanics are actually complementary to wave mechnanics of Schrodinger

$H|\psi(t)>= E|\psi(t)>$

In newtonian mechanics

State of System -- position and momentum

Wave function

State of the system is a column vector
Wavefunction is calculated using matrices by plain multiplication:

$$\psi = \begin{bmatrix} .. & .. \\ .. & .. \end{bmatrix}_{n\times n} \begin{bmatrix} .. \\ .. \end{bmatrix}_{n\times 1}$$

4 quantum numbers: $|n, l, m, s>$

Pauli exclusion -- no two electrons can have the same quantum number

the spin of adjacent electrons can't be the same

Schrodinger equation doesn't give the spin, but Dirac equation does

Solvay conference

Einstein team, and Neils Bohr team

Gedanken Experiments - Einstein

Einsten believed quantum mechanics was wrong, then changed his position to it being incomplete

> "does that mean the Moon is not there when I am not looking at it?"

EPR Paradox

- Let there be 2 identical particles in a quantum system, going in opposite directions, then the measurement of one position immediately determines the position of the other
- Later on, it was called an entangled state, and it didn't violate special relativity