

FURTHER QUANTUM MECHANICS**Review of QM Concepts****Zella Baig****Copied from Dr Palmer**

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Lecture 1: Proof of Concept

Quantum Mechanics is based on three new concepts, none of which have simple correlates in classical physics:

- The state, or ket $|\psi\rangle$;
- The probability amplitude, or amplitude $\langle\phi|\psi\rangle$;
- The operator \hat{A} ;

Combining the last two we obtain the final concept which derives from these:

- The matrix element $\langle\phi|\hat{A}|\psi\rangle$.

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The ket $|\psi\rangle$.

The ket is the complete quantum state of the system, from which we can diagnose all its properties at a given time.

By contrast: **the complete Classical State**

Here is an example of a boxed equation, using the 'cbox' environment.

$$|\psi(t)\rangle = \sum_i c_i \exp(-iE_i t/\hbar) |E_i\rangle.$$

'cbox' is a wrapper for the align* environment; so you may have line breaks:

$$\begin{aligned} |\psi(t)\rangle &= \sum_i c_i \exp(-iE_i t/\hbar) |E_i\rangle. \\ |\phi(t)\rangle &= \sum_i c_i \exp(-iE_i t/\hbar) |E_i\rangle. \end{aligned}$$

We may also use inline boxes with the 'lbox' command: see, for example this inline box: $y = mx + c$ as well as another one: $y \neq mx + b$

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