Classical vs quantum mechanics

	classical	quantum
state space	$X = \mathbb{R}^{6N}, TS^2, \ldots$	$\mathcal{H}$ a Hilbert space.
set of observables	$\mathcal{A} = C^\infty(X,\mathbb{R})$, comm ring	$\mathcal{A}$ a $\mathbb{C}$ - algebra (non-comm)
measurement	If $A \in \mathcal{A}$, $x \in X$ the result of measurement is $A(x)$ & system remains in state x.	For $\forall A \in \mathcal{A}$ $\exists$ orthon. basis (ψ_n^A) & $\exists$ real #'s (λ_n^A) s.t. the foll holds. If sys is in state $\psi = \sum a_n \psi_n^A$ (so $a_n = \langle \psi, \psi_n^A \rangle$)* then after measuring A system will be in state ψ_n^A w/ prob $\lvert a_n \rvert^2$ & the value obtained for A is λ_n^A
		Let $\mathcal{A} \to End(\mathcal{H})$ be def by $A \mapsto \mathbf{A}$, $A(\sum a_n \psi_n^A) = \sum a_n \lambda_n^A \psi_n^A$ Axiom: this is a ring homo ** Remark: ψ_n^A eigvects & λ_n^A eigvals of A Remark: Average value of measurement is $\sum \underbrace{\lvert a_n \rvert^2}_{\text{prob to get } \lambda_n} \lambda_n \underset{\text{easy}}{=} \langle A\psi, \psi \rangle = \langle \psi, A\psi \rangle$
		explain slit experiment to justify working over $\mathbb{C}$ rather than $\mathbb{R}$
		explain non-commuting observables.

* with $\langle \psi, \psi \rangle = 1$

** with image $\subset$ {selfadj ops}.