

## CHAPTER OVERVIEW

### 1: Linear Vector Spaces and Hilbert Space

The modern version of quantum mechanics was formulated in 1932 by John von Neumann in his famous book *Mathematical Foundations of Quantum Mechanics*, and it unifies Schrödingers wave theory with the matrix mechanics of Heisenberg, Born, and Jordan. The theory is framed in terms of linear vector spaces, so the first couple of lectures we have to remind ourselves of the relevant mathematics.

[1.1: Linear Vector Spaces](#)

[1.2: Operators in Hilbert Space](#)

[1.3: Hermitian and Unitary Operators](#)

[1.4: Projection Operators and Tensor Products](#)

[1.5: The Trace and Determinant of an Operator](#)

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