

## Whence the quantum conundrum?

1. Cobbling together a new “theory” (1915–1930)
  - (a) Matrix mechanics (Heisenberg 1925)
    - i. *beobachtbare Grössen*
    - ii. uncertainty principle and disturbance interpretation
  - (b) Wave mechanics (Schrödinger 1925)
    - i. *verdammte Quantenspringerei*
    - ii. Schrödinger equation
  - (c) Complementarity (Bohr 1927)
  - (d) Hilbert space formalism (von Neumann 1926–32)  
No hidden variables theorem
2. Einstein-Bohr debates (1927–1935)
  - (a) Photon box (1927)
  - (b) Einstein-Podolsky-Rosen argument (1935)
  - (c) Realism versus antirealism? Rational versus irrational? Determinism versus “god rolls dice”?
3. Bohr for dummies, a.k.a. Copenhagen/Orthodox interpretation (1935–)  
Collapse of the wavefunction
4. Heretics
  - (a) David Bohm’s “hidden variable” theory (1952)
  - (b) Many worlds (Hugh Everett 1957)
  - (c) Nonlocality (John Bell 1965)
  - (d) “Quantum theory without observers” (Bell 1986)
  - (e) Bell’s disciples (1990–)