

TO KNOW FOR MIDTERM

1. Numerical values (hydrogen atom, magnetic moments...)
2. Angular momentum: rotation operators, algebra, eigenvalues, matrix elements
3. Orbital momentum, spherical functions and Legendre polynomials; specific expressions for $l = 0, 1, 2$
4. Spin 1/2: Pauli matrices, rotation and polarization properties
5. Angular momentum 1, relation to vectors
6. Time dependence of wave functions and operators, Heisenberg equations of motion, virial theorem
7. Particle in a static magnetic field
8. Time-dependent magnetic field and magnetic resonance
9. Potential with central symmetry, separation of variables, degeneracies of the spectrum, asymptotics of the solutions at the origin and at large distances
10. Spherical well, existence of bound states
11. Hydrogen atom, structure of the discrete spectrum, wave functions $1s, 2s, 2p$, momentum representation, electrostatic properties