

Atomic and molecular physics

second written exam retake

December 21, 2017

1. Prove the anticommutation relation $\{G_\mu, G_\nu\} = 2\delta_{\mu\nu}$ for the canonical representation of Dirac matrices.
2. Predict the ground configuration for C_2 , N_2^- and Ne_2^+ . In each case, determine the molecular term symbol with lowest energy.
3. Derive the construction of sp^2 hybrid orbital wavefunctions that are identical in trigonal symmetry (C_3). Hint: use the orthonormality requirement for the hybrid orbitals.