Phys 402
Fall 2022
Homework 6
Due Wednesday, 12 October, 2022 @ 10 AM

1. Griffiths, 3rd Edition, Problem 5.4 [Normalization of 2-identical-particle wavefunctions]

2. Griffiths, 3rd Edition, Problem 5.5 [2-identical-particles in an infinite square well - energies and wavefunctions]

3. Griffiths, 3rd Edition, Problem 5.7, parts (a)-(c) ONLY [Radial distribution functions for 2-particles in a harmonic oscillator potential]

4. Griffiths, 3rd Edition, Problem 5.10 [Three identical Fermion wavefunctions]

5. Griffiths, 3rd Edition, Problem 5.16 [Wavefunction for the Li atom ground state]

6. Griffiths, 3rd Edition, Problem 5.17 [Periodic table electron configurations]

7. Griffiths, 3rd Edition, Problem 11.2 [Matrix elements for electric field perturbation of the Hydrogen atom]

Extra Credit #6 The Hamiltonian of a system consisting of two identical spin-1/2 particles is $\mathcal{H} = \frac{\vec{p}_1^2}{2m} + \frac{\vec{p}_2^2}{2m} + \frac{1}{2}k\left(\vec{x}_1^2 + \vec{x}_2^2\right) + \lambda\vec{S}_1 \cdot \vec{S}_2$, where λ is real and $-\infty < \lambda < +\infty$. Find the lowest energy level as a function of λ.