Physics 451 **Winter 2026**

Homework #5

(due Wednesday, February 18, 2026)

1. (10 pts) McIntyre 10.15
2. (10 pts) McIntyre 10.23
3. (10 pts) McIntyre 10.24
4. (10 pts) Show the following:
   (a) $[J_z, J_\pm] = \pm\hbar J_\pm$
   (b) $J_- J_+ = \mathbf{J}^2 - J_z^2 - \hbar J_z$
   (c) McIntyre 11.7
5. McIntyre 11.4

6. Reading: Ch. 11 of McIntyre.

The following questions are for practice (not for submission):

1. McIntyre 11.9
2. McIntyre 11.10