

SENATE No. 77

By Mr. Lynch, a petition (accompanied by bill, Senate, No. 77) of the Massachusetts Alliance of Utility Workers, AFL-CIO, by Paul Hannon, and Stephen F. Lynch for legislation to require the Department of Employment and Training to honor claims for reemployment assistance benefits under the electric utility deregulation law. Commerce and Labor.

The Commonwealth of Massachusetts

In the Year One Thousand Nine Hundred and Ninety-Nine.

AN ACT CLARIFYING REEMPLOYMENT ASSISTANCE BENEFITS FOR DISPLACED UTILITY WORKERS.

Be it enacted by the Senate and House of Representatives in General Court assembled, and by the authority of the same, as follows:

- 1 Notwithstanding any general or special law to the contrary the
- 2 Department of Employment and Training shall take necessary steps
- 3 to honor all claims for Reemployment Assistance Benefits autho-
- 4 rized under the provisions of Chapter 154 of the Acts of 1997.

PHYSICS 551 - QUANTUM MECHANICS
 LECTURE 10: ANGULAR MOMENTUM
 The angular momentum operator is defined as $\mathbf{L} = \mathbf{r} \times \mathbf{p}$. In Cartesian coordinates, the components are $L_x = y p_z - z p_y$, $L_y = z p_x - x p_z$, and $L_z = x p_y - y p_x$. The commutation relations for the components are $[L_x, L_y] = i\hbar L_z$, $[L_y, L_z] = i\hbar L_x$, and $[L_z, L_x] = i\hbar L_y$. The total angular momentum squared operator is $L^2 = L_x^2 + L_y^2 + L_z^2$, which commutes with each component: $[L^2, L_i] = 0$. The eigenvalues of L^2 are $\hbar^2 l(l+1)$ and the eigenvalues of L_z are $\hbar m$, where l is the orbital quantum number and m is the magnetic quantum number.

ANGULAR MOMENTUM AND SPIN

In addition to orbital angular momentum, particles possess an intrinsic angular momentum called spin. The spin operator \mathbf{S} is defined analogously to \mathbf{L} . For a spin-1/2 particle, the eigenvalues of S^2 are $\hbar^2 s(s+1) = \hbar^2 (1/2)(3/2) = 3\hbar^2/4$ and the eigenvalues of S_z are $\hbar m_s = \pm \hbar/2$. The total angular momentum $\mathbf{J} = \mathbf{L} + \mathbf{S}$ has eigenvalues $\hbar^2 j(j+1)$ and $\hbar m_j$, where $j = l \pm 1/2$ and $m_j = m \pm 1/2$. The addition of angular momenta is governed by the Clebsch-Gordan coefficients.