Announcement-2/24/03

- As I said in my e-mail on Sunday, the book has an unfortunate typographical error for Equation 12-62, incorrectly adding a factor of 2 to the Laplacian. You should therefore correct your class notes from Friday, February 21, to read as follows:

In spherical coordinates, \( \nabla^2 = \frac{\partial^2}{\partial r^2} + \frac{1}{r} \frac{\partial}{\partial r} + \frac{1}{r^2} \Lambda^2 \)

So, for the particle on a sphere, where \( r \) is fixed, the Hamiltonian simplifies as follows:

\[
\hat{H} = -\frac{\hbar^2}{2m} \frac{1}{r^2} \Lambda^2 = -\frac{\hbar^2}{2I} \Lambda^2
\]

and the Schrödinger equation is

\[
\frac{\hbar^2}{2I} \Lambda^2 \psi(\theta,\phi) = E \psi(\theta,\phi)
\]

Note that this Schrödinger equation for the rotational kinetic energy of a particle trapped on a sphere (written correctly) is completely analogous to the Schrödinger equation one would write for the kinetic energy of a particle trapped in an infinite well:

\[
-\frac{\hbar^2}{2m} \frac{\partial^2}{\partial x^2} \psi(x) = E \psi(x)
\]