Generation of $d_{z^2}$ orbital through a linear combination of $d_{z^2-x^2}$ and $d_{z^2-y^2}$

## Angular Probability Function

: We are interested in the probability of finding an electron, so wish to examine the function $\Theta^2 \phi^2$ since it corresponds to the angular part of $\psi^2$. When the angular functions are squared different orbitals change in different ways. For an "s-orbital" the spherical symmetry remains unchanged on squaring. But the sign of the wave function is obviously dropped. For p-orbitals the envelope becomes more elongated. The '+' and '−' signs necessarily disappear.
The same change occur for the d-orbitals.