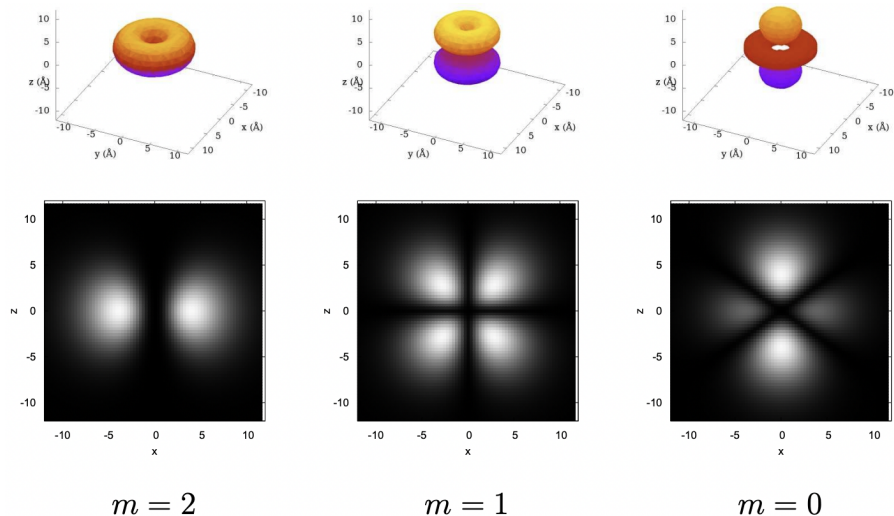
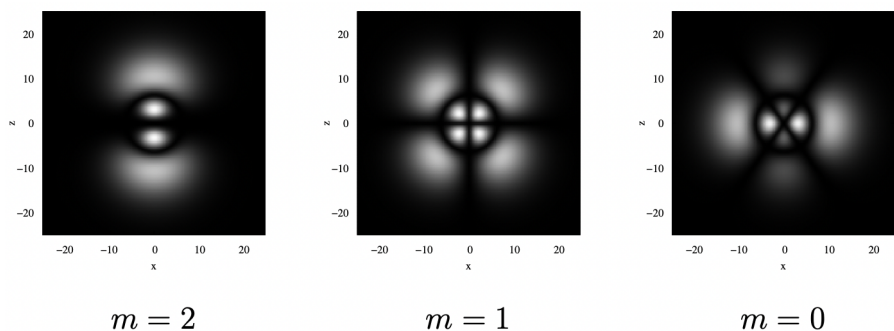


### 14.3.3: d Orbitals

When  $l = 2$ , the orbitals that are the solutions of the Hydrogen atom Schrödinger equation are called  $d$  orbitals. These orbitals only exist for shells with  $n = 3$  and greater, again because  $l$  must be less than  $n$ . As we saw with the  $p$  orbitals, the probability density for the electron in space is the same for  $+m$  and  $-m$ . As such, we'll only plot the positive- $m$  versions of the orbitals. As before, in addition to a 3d plot showing “shells” at a constant probability level, there is a 2d plot showing a cut in the  $x - z$  plane.



As with the  $p$  orbitals, as we go to the  $d$  orbitals in higher shells they get more interesting. Plotted below are the cuts through the  $x - z$  plane for the  $4d$  orbitals:



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