

Solution

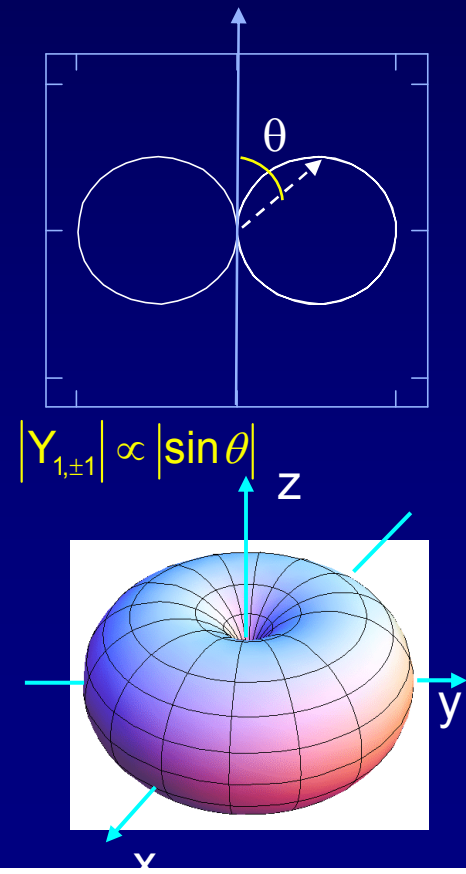
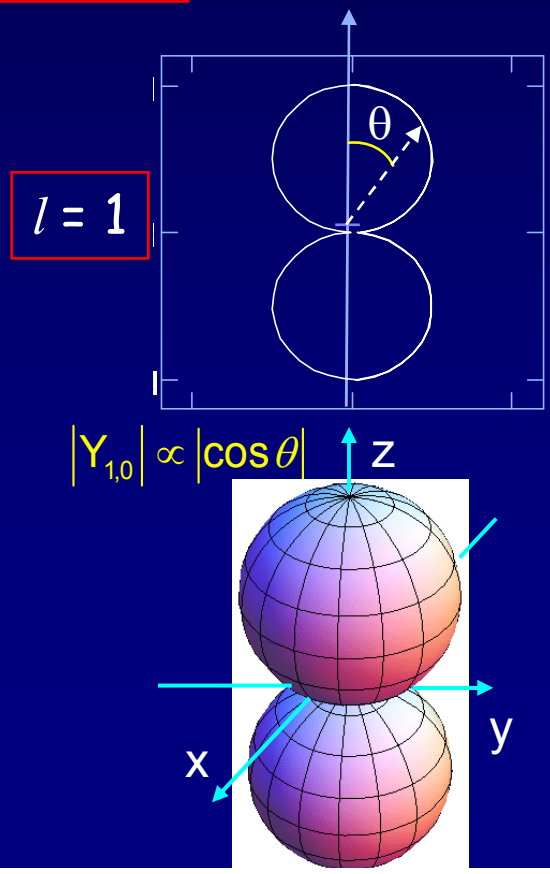
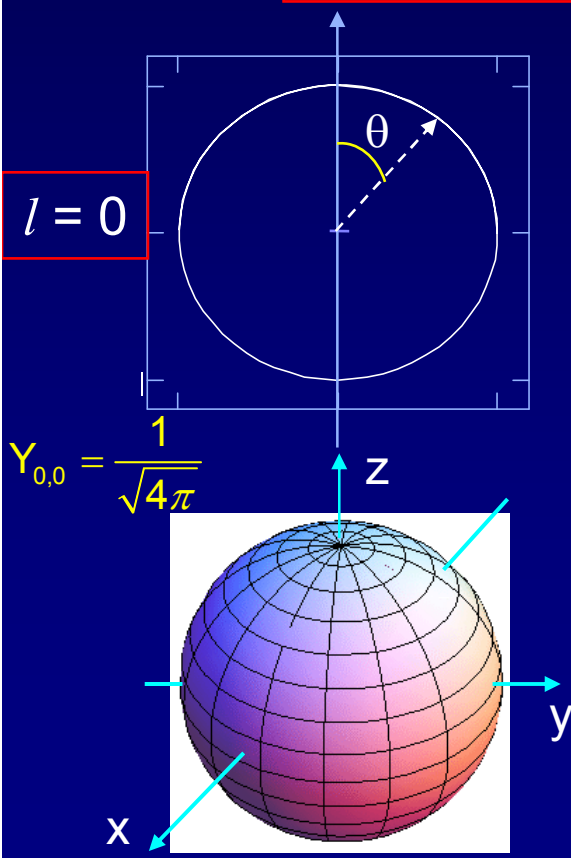
1. Suppose the electron is in the $l=1, m=1$ state. In what direction(s) (at what θ), is the electron most likely to be found? $Y_{1,\pm 1} \propto \sin \theta$

a. $\theta = 0^\circ$ (north pole)

b. $\theta = 45^\circ$

c. $\theta = 90^\circ$ (equator)

$\sin \theta$ is maximum at $\theta = 90^\circ$.



Length of the dashed arrow is the magnitude of Y_{lm} as a function of θ .