

Note that $|Y_{\ell}^m(\theta, \phi)|^2$ is independent of ϕ !

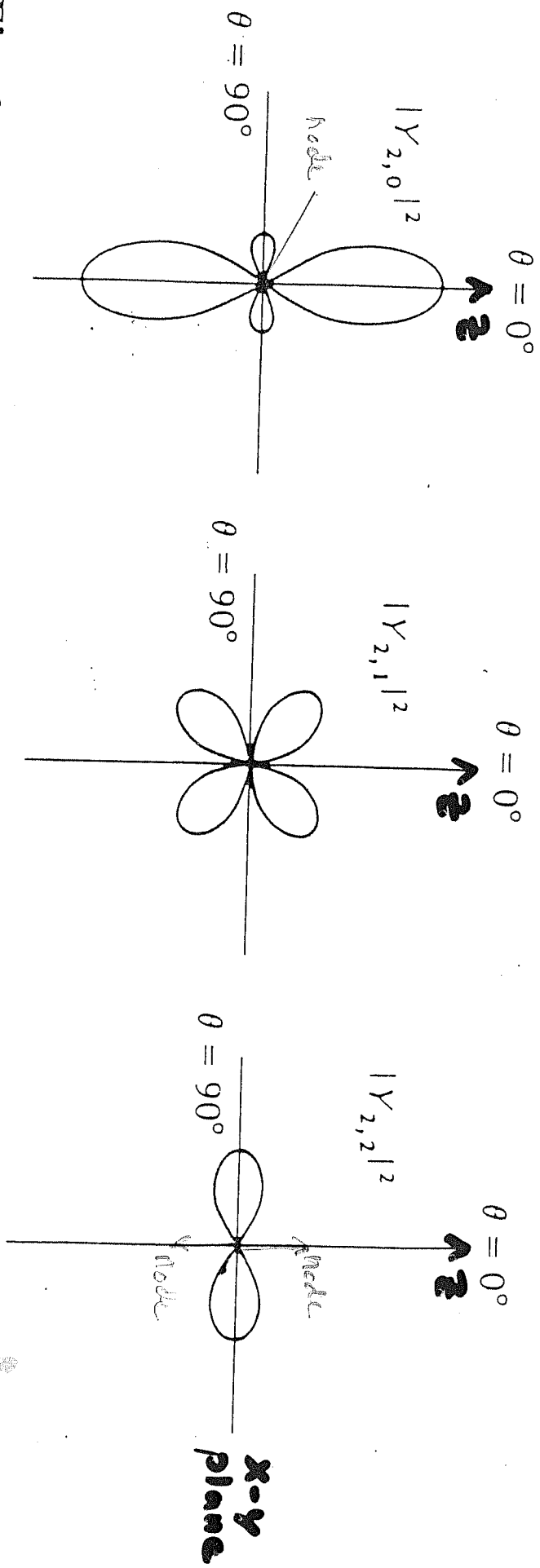


Fig. 3. Polar plots of some probability densities $|Y_{\ell, m}|^2$ as functions of θ .

$$|Y_{2,0}(\theta, \phi)|^2 = \frac{5}{16\pi} (3\cos^2\theta - 1)^2$$

= 0 for

$$\cos\theta_0 = \frac{1}{\sqrt{3}} \Rightarrow \theta_0 = 54.7^\circ$$

$$|Y_{2,1}(\theta, \phi)|^2 = \frac{15}{9\pi} \sin^2\theta \cos^2\theta$$

= 0 for

$$\theta = 0, \frac{\pi}{2}, \pi, \frac{3\pi}{2}, \pi$$

$$|Y_{2,2}(\theta, \phi)|^2 = \frac{15}{32\pi} \sin^4\theta$$

= 0 for $\theta = 0, \pi$