## Central Forces Visualizing Spherical Harmonics

Each group will be assigned a specific spherical harmonic,  $Y_{\ell}^{m}(\theta, \phi)$ . On your balloon, mark:

- $\theta = 0$
- $\phi = 0$
- The value of your  $Y_{\ell}^m$  (using an Argand-like diagram) at several values of  $\theta$  and  $\phi$ .

Answer the following questions:

1. What happens at the poles?

2. How many times does the phase complete a full rotation around the equator?

3. Compare with a group with a different spherical harmonic. How do they compare? What would happen if you add them together?

by Corinne Manogue, Ethan Minot, Mary Bridget Kustusch ©2012 Corinne A. Manogue