

spherical harmonic basis functions we employ (here and throughout this chapter) are normalized such that

$$\frac{1}{4\pi} \int_0^{2\pi} \int_0^\pi Y_{\ell_1}^{m_1}(\theta, \phi) Y_{\ell_2}^{m_2}(\theta, \phi)^* \sin \theta d\theta d\phi = \delta_{\ell_1, \ell_2} \delta_{m_1, m_2}. \quad (\text{II.3})$$

The spherical harmonics we employ are therefore obtained from the  $Y_\ell^m$  defined in Eq. [2.5.29] of Edmonds (1960) by setting  $4\pi \rightarrow 1$ .

$$Y_\ell^m(\theta, \varphi) = (-1)^m \sqrt{(2\ell+1) \frac{(\ell-m)!}{(\ell+m)!}} P_\ell^m(\cos \theta) e^{im\varphi}$$