

Practice Problems Related to Bound-Bound and Bound-Free Transitions

1. Verify explicitly that $\int Y_{1m}^* Y_{10} = 0$ if $m \neq 0$.
2. More generally, can you prove the orthonormality of the spherical harmonics?
3. Also verify explicitly the expansions of $x \pm iy$ and z in spherical harmonics that are given in the notes.