# PHY 745 – Problem Set #7

This homework is due Wednesday, February 4, 2009.

Finish reading Chapter 3 and start Chapter 4 in **Tinkham**.

1. Consider the following 3-dimensional transformation matrix

$$\mathcal{R} = \begin{pmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 1 & 0 & 0 \end{pmatrix}. \tag{1}$$

 (a) Find Euler angles $\alpha$, $\beta$, and $\gamma$ that correspond to that transformation (with or without inversion).

 (b) Consider the transformation of the $l = 1$ spherical harmonic functions, using your Euler angles and Eq. 5-36 of your text.

 (c) Check that

$$Y_{lm}(\widehat{\mathcal{R}\mathbf{r}}) = \sum_{m'} Y_{lm'}(\hat{\mathbf{r}})\mathcal{D}^l_{m'm}(\mathcal{R}). \tag{2}$$