Phys 652 Winter 2024

Worksheet # 9

Wednesday, February 14, 2024

Name

Question (5 pts):

For the case j = 1, the matrix representation of rotation about the y-axis in the {|11>, |10>, |1-1>} basis is:

$$d^{(1)} = \begin{pmatrix} \frac{1}{2}(1+\cos\beta) & -\frac{\sqrt{2}}{2}\sin\beta & \frac{1}{2}(1-\cos\beta) \\ \frac{\sqrt{2}}{2}\sin\beta & \cos\beta & -\frac{\sqrt{2}}{2}\sin\beta \\ \frac{1}{2}(1-\cos\beta) & \frac{\sqrt{2}}{2}\sin\beta & \frac{1}{2}(1+\cos\beta) \end{pmatrix}$$

The system is in the state |1,0>. What is the probability that after rotation it ends up in |1,1> ? |1, -1>? Will remain in |1,0>?