University of Calgary
Winter semester 2006

PHYS 443: Quantum Mechanics I

Home assignment 8

Not assigned, recommended for practice

Problem 8.1. Free electrons are prepared with the spin projection onto the z-axis $m_s = +1/2$. At $t = 0$, a magnetic field B in the x-direction is turned on. After time t has elapsed, the field is turned off and the electrons are subjected to the Stern-Gerlach measurement with the field oriented along y. Determine the splitting ratio.

Problem 8.2. A pair of spin-1 particles is prepared in the state

$$|\Psi_{AB}\rangle = \frac{1}{\sqrt{2}} \left(|m_s = 1\rangle \otimes |m_s = 1\rangle - |m_s = -1\rangle \otimes |m_s = -1\rangle \right)$$

and sent to Alice and Bob. Each observer performs a Stern-Gerlach measurement of the x-component of their particle's angular momentum. Find the expectation value for the product of their measurement results.