Spin One Unknowns

Choose Unknown # 1 under the initialize menu. This will cause atoms to leave the oven in a definite quantum state, which we call $|\psi_1\rangle$. Now measure the nine probabilities $|\langle\phi|\psi_1\rangle|^2$, where $|\phi\rangle$ corresponds to spin projections of $\hbar$, 0, and $-\hbar$ along the three axes. Fill in the table on the worksheet. Figure out what $|\psi_1\rangle$ is. Repeat for Unknown # 4 ($|\psi_4\rangle$). In solving for the unknown states, use the convention that the coefficient of $|1\rangle$ is chosen to be real and positive. Design an experiment to verify your results.

Unknown $|\psi_1\rangle$

Probabilities	Axis		
Result	x	y	z
$S_i = \hbar$			
$S_i = 0$			
$S_i = -\hbar$			

Unknown $|\psi_2\rangle$

Probabilities	Axis		
Result	x	y	z
$S_i = \hbar$			
$S_i = 0$			
$S_i = -\hbar$			