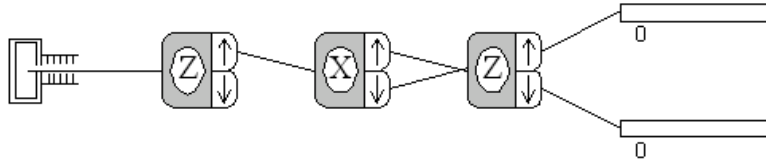


Spin- $\frac{1}{2}$ Interferometer

1. Make an interferometer as shown:



Use Random as the initial state. Measure the relative probabilities of spin up and spin down after the final SG device. Do this for the three cases where (1) the spin up beam from the middle SG device is used, (2) the spin down beam from the middle SG device is used, and (3) both beams from the middle SG device are used (as the figure shows). Put your experimental results in the table of the worksheet. Repeat for the case where the spin down state is used from the first SG device.

Spin- $\frac{1}{2}$ Interferometer

Beams Used		Experiment		Theory	
SG1	SG2	P \uparrow	P \downarrow	P \uparrow	P \downarrow
$+$	$+$ \rangle_x				
	$-$ \rangle_x				
	$+$ \rangle_x , $-$ \rangle_x				
$-$	$+$ \rangle_x				
	$-$ \rangle_x				
	$+$ \rangle_x , $-$ \rangle_x				

2. Using the interferometer shown above, select Watch under the Control menu. This feature causes a light to flash at the port where an atom exits. The program now only allows the Go mode. Run the experiment and notice how your results compare to the results obtained above.