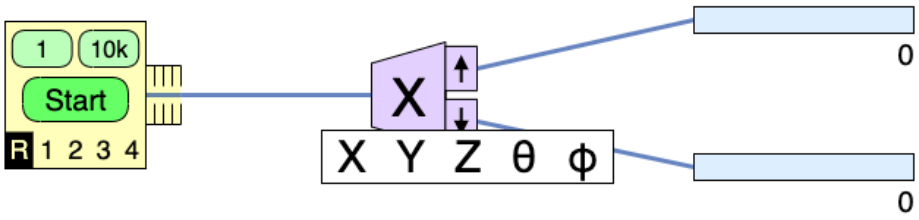
Student handout

Getting Acquainted with the Stern Gerlach Experiment Simulation

1. Measure a single particle's z-component of spin S_z

   a) The default experiment is to measure S_x so we need to change the orientation of the analyzer. Change the orientation of the analyzer by clicking on "X" label and selecting "Z".



   b) To send 1 particle through the experiment, click on the box labeled "1" on the oven (the green box on the left). Each measurement result will either be $S_z = \frac{+\hbar}{2}$ or $S_z = \frac{-\hbar}{2}$. Do this several times.

   Do you notice any patterns?

   c) Try sending 10,000 atoms through the experiment.

   d) Try sending atoms continuously by pressing the "Start" button.

   What are you noticing about these experiments?

2. Do some experimenting and determine the probability that a particle leaving the oven will end up in the top counter. How confident are you in your estimate?

1 Student Ideas:

- Students compare this to a coin toss - this is a really productive comparison to make at this stage.
- Students have intuition that the more particles you send it, the more confident you can be that your estimate is close to the true probability. This is great intuition to have.
- The last question can be built on by following this activity with a lecture about average, standard deviation, and standard error.