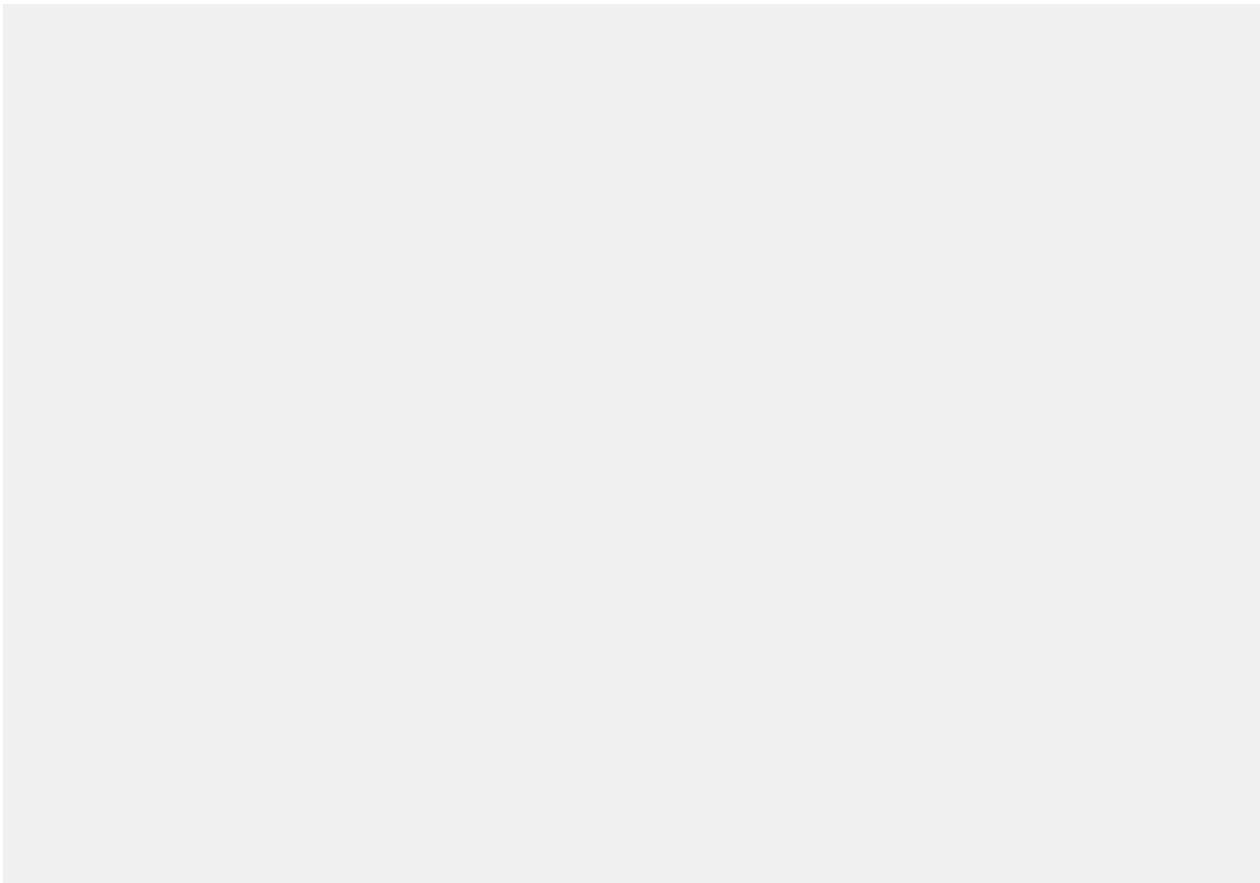


[PROJECT](#)[PROGRAMS](#)[RESEARCH](#)

Single Slit Diffraction

STEP 1: Choosing the Particle Source

The particle sources (white cylinders) pointing away from you on the center left of the screen are not labeled, but if you move your cursor over them, the label appears. As soon as you spot the source whose diffraction pattern you wish to observe, click on it. The existing source that is in the holder will retreat, and the chosen source appears ready to fire in the holder. You may choose from electrons, protons, neutrons, photons, or pions.

STEP 2: Changing the Energy/Wavelength of the Particles

To change the kinetic energy (or wavelength for photons) of the source particles drag the slider below the array of sources to the desired energy. If your chosen particle is a photon, yo

will be presented with a slider that allows you to control the wavelength of the photon rather than its energy.

STEP 3: Changing the slit width

Drag the slider at the bottom right of the screen to change the slit width. As you drag the slider you will see the slit get wider or narrower in the experimental view.

STEP 4: Changing the Particles Per Second

You can control the rate at which particles are emitted by dragging the "Particles per second" slider that is just above the slit width slider. You can decrease the particle rate to as low as 1 particle per second. This feature is especially useful if you are interested in predicting where the particles are likely to appear on the screen and verify your predictions with the program.

STEP 5: Observing the Pattern Develop

After you have selected the particle, adjusted its energy, changed the slit width, and controlled the number of particles that will be emitted by the source per second, you are ready to start the simulation. Click the Start button that is directly below the array of sources. You will observe the diffraction pattern develop, and a counter for the total number of particles on the screen being incremented. The Start button changes into the Stop button, which can be clicked at any time to stop the simulation.

STEP 6: Comparing Diffraction Patterns

Once a diffraction pattern has been created it may be dragged (with the left mouse held down) to the right where it will be saved. In addition to the pattern on the screen the saved pattern will include information about the type of particle, energy or wavelength , slit width, a number of particles. Up to 4 diffraction patterns may be saved and compared at any one time.

Direct comments to: **Chandima Cumaranatunge** (programming aspects); **Sanjay Rebello** (physics content).

© 1997-2004, Physics Education Research Group, Kansas State University.