

Physics applets for Mechanical Waves and Light (All URLs correct as of 12/19/04)

These URLs have many applets on many topics:

1. Walter Fendt: <http://www.walter-fendt.de/ph11e/>
2. Northwestern University: <http://www.physics.nwu.edu/ugrad/vpl/index.html>
3. Applets of C.K. Ng: <http://www.ngsir.netfirms.com/englishVersion.htm>

Simple harmonic motion, oscillations

1. Shows horizontal spring with a mass, position, velocity and acceleration graphs
On Christian and Belloni Physlet CD:
[\applets\physletprob\NCAT\oscillations\spring_with_all_graphs.htm](http://www.physletprob\NCAT\oscillations\spring_with_all_graphs.htm)
2. Shows relationship between mass at end of horizontal spring and object on wheel going in circle
On Christian and Belloni Physlet CD:
[\applets\physletprob\NCAT\oscillations\circle.htm](http://www.physletprob\NCAT\oscillations\circle.htm)
3. Oscillation and waves using single Hookean spring
<http://www.phy.ntnu.edu.tw/java/springWave/springWave.html>
4. Shows relationship between mass at end of horizontal spring and object on wheel going in circle
<http://www.phy.ntnu.edu.tw/java/shm/shm.html>

Pulses

1. Reflection of pulses at boundaries, fixed, free, two different density strings
<http://www.kettering.edu/~drussell/Demos/reflect/reflect.html>
2. Superposition of pulses (same or opposite side)
<http://www.phy.ntnu.edu.tw/java/wave/impulse.html>
3. Build the shape of your pulse and drag to see superposition
http://mysite.verizon.net/vzeoacw1/wave_interference.html

Wave motion

1. Excellent for showing motion of longitudinal wave, water wave particle moving in circle
<http://www.kettering.edu/~drussell/Demos/waves/wavemotion.html>
2. Transverse, longitudinal wave mixture
<http://www.physics.nwu.edu/ugrad/vpl/waves/wavetypes.html>
3. Shows longitudinal waves, can vary frequency and amplitude
<http://surendranath.tripod.com/Applets/Waves/Lwave01/Lwave01Applet.html>

Superposition, standing waves and resonance

1. Combining two waves together to produce a standing wave
http://www.cabrillo.edu/~jmccullough/physlets/waves/waves_4.html
2. Superposition of waves
<http://www.phy.ntnu.edu.tw/java/waveSuperposition/waveSuperposition.html>
3. Superposition of waves
<http://www.kettering.edu/~drussell/Demos/superposition/superposition.html>
4. Two strings, each with one wave on it. The waves can be added on a third string. Can vary type of wave, speed, amplitude, direction and frequency.
http://www.phys.ksu.edu/perg/vqmorig/programs/java/makewave/Pulse/vq_mwp.htm
5. Standing longitudinal waves. Very good, shows standing waves in tubes closed on one end, open on both ends and closed on both ends. Can vary harmonics from 1st to 6th.
<http://www.walter-fendt.de/ph11e/stlwaves.htm>
<http://www.walter-fendt.de/ph14e/stlwaves.htm>
6. Can show fundamental and first 3 overtones of instruments with two fixed end, one fixed end or no fixed ends. Can also add all four frequencies together and see resulting pattern.
<http://mysite.verizon.net/vzeoacw1/harmonics.html>
7. Reflection of sin wave fixed ends or free end setting up good 3 antinode standing wave
<http://www2.biglobe.ne.jp/~norimari/science/JavaEd/e-wave5.html>

8. This one has wave trains from opposite directions. You can change the frequency and amplitude of each train (go to the bottom of the page) VERY GOOD
http://cspar181.uah.edu/PHY113/QZ_B.html
9. Two strings, each with one wave on it. The waves can be added on a third string. Can vary type of wave, speed, amplitude, direction and frequency.
http://www.phys.ksu.edu/perg/vqmorig/programs/java/makewave/Waves/vq_mww.htm
10. Triangle wave superposition
<http://www2.biglobe.ne.jp/~norimari/science/JavaEd/e-wave3.html>
11. Resonance applet
<http://www.swgc.mun.ca/physics/physlets/resonance.html>
12. How a standing wave is propagated (wave shape not the best)
<http://www2.biglobe.ne.jp/~norimari/science/JavaEd/e-wave4.html>
13. Adjust frequency of a wave driver to get string to resonate in first 6 modes
<http://www.ngsir.netfirms.com/englishhtm/StatWave.htm>
14. Transverse standing waves, two fixed ends or one free and one fixed, can vary from fundamental to 6th harmonic. <http://www.ngsir.netfirms.com/englishhtm/TwaveStatA.htm>
15. Site trying to sell a video of people causing a bridge to resonate by jumping on it
<http://www.messiah.edu/hpages/facstaff/barrett/video2.htm>

Beats

1. Superposition adding to beats
<http://www.physics.nwu.edu/ugrad/vpl/waves/superposition2.html>

Doppler Effect

1. Doppler shift
<http://webphysics.davidson.edu/Applets/Applets.html>
2. Doppler shift simulation. Ambulance gong by person
<http://www.walter-fendt.de/ph11e/dopplereff.htm>

Interference

1. Ripple tank simulation, will allow one to get the coordinates of any location.
<http://www.phas.ucalgary.ca/physlets/ripple.htm>
2. Colored ripple tank simulation, can vary many parameters, one source, two source, one slit, two slits.
<http://www.falstad.com/ripple/>
3. Very nice for showing the effect of distance between slits and wavelength. Will calculate the path difference in wavelengths at any location.
<http://webphysics.ph.msstate.edu/javamirror/ntnujava/doubleSlit/doubleSlit.html>
4. Interference of two circular waves. Can vary distance between sources and the wavelength.
<http://www.walter-fendt.de/ph11e/interference.htm>
5. A two source circular interference pattern. Can vary wavelength, separation and phase. Has moiré look to it. http://www.phys.ksu.edu/perg/vqmorig/programs/java/makewave/Slit/vq_mws.htm
6. Diffraction through a single opening in a ripple tank. Can vary wavelength and opening width.
<http://www.ngsir.netfirms.com/englishhtm/Diffraction.htm>
7. Diffraction around an obstacle in a ripple tank. Can vary wavelength and size of obstacle.
<http://www.ngsir.netfirms.com/englishhtm/Diffraction2.htm>
8. A two source interference pattern representing water waves. Can vary wavelength, separation and phase. <http://www.ngsir.netfirms.com/englishhtm/Interference.htm>
9. A two slit interference pattern. Can vary wavelength, separation and phase. Shows fringes on a screen. <http://www.phys.ksu.edu/perg/vqmorig/programs/java/makewave/olddouble/Slit.html>
10. Shows two slit interference pattern. Not the greatest, but emphasizes how the pattern appears on a screen. <http://www.control.co.kr/java1/masong/twoslit.html>

Refraction and Reflection

1. Shows a plane wave both reflecting and refracting at a boundary. Can vary indexes and incident angle. <http://www.walter-fendt.de/ph11e/huygenspr.htm>
2. A flashlight beam that can be rotated 360 degrees. The beam travels through your choice of 5 media. Shows only refraction. <http://www.geocities.com/thesciencefiles/refraction/refraction2.html>
3. A flashlight has a beam that travels from air to water or water to air. Can move flashlight to vary angle. Shows both reflection and refraction. Nice for critical angle. <http://www.phy.ntnu.edu.tw/java/light/flashLight.html>
4. Plane waves advance through a medium with index 1.0 toward a second medium for which you have 7 choices. Can vary incident angle and wavelength. Shows shortened wavelength. http://www.physics.uoguelph.ca/applets/Intro_physics/refraction/LightRefract.html