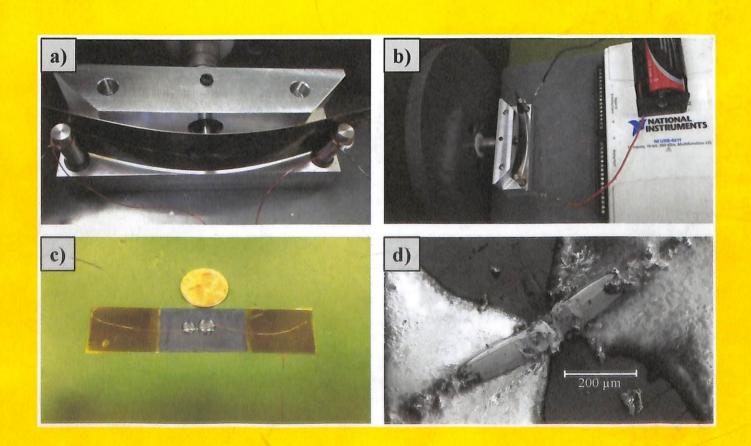
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Volume 81, No. 1 January 2013

Cover figure: Pictures of a Mechanically Controlled Break Junction (MCBJ) experiment that exhibits conductance quantization. (a) A gold wire is mechanically broken with the aid of a micrometer-controlled bending beam. (b) A larger-scale view of the experiment. (c) A close-up of the gold wire mounted on a sheet of spring steel. (d) A scanning electron microscope image of the gold wire shows a partial cut made to create a weak point in the wire. See the article on page 14 to learn more about this experiment.

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Heron

Cover figure: A metal sphere is embedded in a transparent resin and heated using a high-power (green) laser. The temperature distribution results in a thermal lens that is used to scatter incoming (red) laser light. See the article on page 405 to learn more about this "photonic Rutherford scattering."

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Using a mobile phone acceleration sensor in physics experiments on free and damped harmonic oscillations

Juan Carlos Castro-Palacio, Luisberis Velázquez Abad, Marcos H. Giménez, and Juan A. Monsoriu

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 by Silvan S. Schweber
 The Fractalist: Memoir of a Scientific Maverick
 by Benoit Mandelbrot
 Quasicrystals: A Primer (2nd ed.) by Christian Janot
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Kurt Gottfried
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Cover figure: A Brownian-motion experiment images micron-sized polystyrene sphere beads: (a) Schematic diagram; (b) image taken at 100X magnification; (c)-(d) processed image and bead positions over time; (e) histogram of displacement data for many beads; (f) mean-square-displacement vs. time for many particles. See the article on page 485 to learn how these data can be used to determine the diffusion coefficient.

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Massimiliano Sassoli

de Bianchi

Cover figure: Three educational plasma devices based on dc glow discharges: (a) a basic, introductory laboratory device, (b) and (c) an advanced glow discharge with magnets, and (d) a discharge with Langmuir probes. See the article on page 663 for more details on how such devices can be used with students.

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Cover figure: "Cobweb" plots for the logistic map difference equation showing (a) a steady-state fixed-point solution, (b) a steady-state period-4 oscillation, and (c) deterministic chaos. See the article on page 725 for more details on how to explore dynamical systems and chaos with students using the logistic map.

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Cover figure: A "light cone" is created when a laser pointer is shone straight down into a tank of water that sits directly on a white piece of paper. See the article on page 815 to find out how students are led to use the process of scientific inquiry to investigate why and how this cone forms.

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Cover figure: Schematic of a split-ring resonator and coupling loops mounted inside a conducting tube (shown in cross section). The resonance frequency changes dramatically depending on whether the conducting tube is filled with air or water. See the article on page 899 to find out how increasing the conductivity of the water leads to a significant broadening of the resonance curve.

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