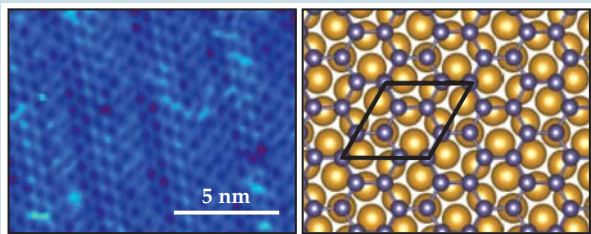


pure enantiomers of $C_{10}H_{15}BrO$ and determined reaction rates by measuring the current of Br^- produced in the dissociation. For the lowest-energy electrons studied (less than 0.1 eV), when the handedness of the electrons and $C_{10}H_{15}BrO$ matched, the current obtained was greater than in the mismatched case by a few parts in 10^4 . No current difference was observed when polarized electrons reacted with a 50-50 mixture of the two molecular enantiomers. (J. M. Dreiling, T. J. Gay, *Phys. Rev. Lett.* **113**, 118103, 2014.) —SKB

Graphene's newest cousin, germanene. As interest in graphene has exploded over the past decade, so, too, has interest in other two-dimensional materials, in the expectation that they will likewise exhibit unusual and impressive electrical and optical properties. Boron nitride, in which B and N alternately replace carbon atoms in graphene's honeycomb lattice, was quick out of the gate. A Turkish team predicted in 2009 that silicon and germanium would be stable in a free-standing, low-buckled honeycomb geometry. Within a few years, several groups reported success in synthesizing single layers of silicene, the Si analogue of graphene. Now María E. Dávila (Madrid Institute of Materials Science), Angel Rubio (University of the Basque Country), Guy Le Lay (Aix-Marseille University), and their colleagues present compelling evidence



for the Ge version, germanene. Although Le Lay and his coworkers had successfully used a silver template in 2012 for silicene, initial attempts to synthesize germanene on a silver substrate failed. But noting that gold deposited on Ge forms clean interfaces, the researchers switched to depositing Ge on Au. And among the many phases in the resulting Ge film were large domains that showed a telltale honeycomb pattern in scanning tunneling micrographs. Earlier this year a Chinese team reported observations of buckled germanene on platinum in STM. The European researchers went further: Low-energy electron diffraction, x-ray spectroscopy, and advanced density functional calculations all pointed to the regions indeed being nearly flat, single-layer germanene, though perhaps with some Au atoms sneaking in. (M. E. Dávila et al., *New J. Phys.* **16**, 095002, 2014.) —RJF

Solving mazes with glowing plasma. In 2002 Andreas Manz of Imperial College London and his collaborators demonstrated a novel way to solve mazes. First, they etched a maze pattern onto a microfluidic chip using laser lithography. Then they filled the device with low-pressure helium. To find the shortest path to the center of the maze, they attached electrodes to the entrance and center of the maze. Turning up the voltage to 20–30 kV triggered the abrupt formation of a glowing plasma discharge that picked out and lit up the shortest path. Now Alexander Dubinov of the Russian Federal Nuclear Center in Sarov and his collaborators have devised a way to make the maze-solving technique cheaper and potentially more practical. Manz's original approach entailed etch-



ing a new chip for each maze pattern, which is time-consuming and expensive. The use of helium and high voltages also push up the cost. Dubinov's mazes consist of polyamide walls sandwiched between plexiglass. They are filled with low-pressure air and operate at voltages of a few kilovolts.

Thanks to the ease with which the walls can be reconfigured, Dubinov and his collaborators could readily investigate how the plasma solves the mazes. They discovered,

for example, that when the shortest path includes sections that require electrons to move away from the anode, the voltage needed to solve the maze drops. With further development, the technique could enable robots to navigate mazes and solve other topological problems. (A. E. Dubinov et al., *Phys. Plasmas* **21**, 093503, 2014.) —CD

Fourier plane imaging microscopy. These days the compound microscope is nearly as ubiquitous in physics and materials science labs as in biology and medical venues. In its simplest form, the instrument uses two-stage magnification—

once with an objective lens close to the sample and once again with the eyepiece. The resulting image is formed at the real focal plane where we typically place our eye or a camera; its resolution is determined by the well-known Rayleigh diffraction limit, though various tricks can be employed to improve the resolution somewhat. The intermediate image, appearing within the microscope's barrel at the so-called rear objective focal plane or Fourier plane, is rarely considered to have its own merits. But Texas Tech graduate student Daniel Dominguez, his adviser Luis Grave de Peralta, and their colleagues decided

to take a closer look by inserting a second camera to image the Fourier plane. They fabricated photonic crystals (PCs) with nicely periodic holes or pillars as test samples for their microscope setup, whose expected resolution is about 440 nm. At the instrument's eyepiece, hole spacings of 500 nm and 450 nm in the PCs were clearly resolved, but smaller spacings were not. A very different image appeared at the Fourier plane, however, with some diffraction information clearly visible (top image, for a 250-nm PC). By carefully extrapolating the arcs into full diffraction rings, the physicists could reconstruct a real-plane image with the correct periodicity (bottom). The technique seems robust and can work for non-periodic samples, although the origins of the Fourier-plane details are still under investigation. (D. Dominguez et al., *J. Appl. Phys.* **116**, 103102, 2014.) —SGB ■

