

## **Aided by liquid crystal, light focuses light**

Researchers at Nagaoka Institute of Technology (Nagaoka, Japan) have demonstrated an all-optical focal-length converter based on dye dissolved in a nematic liquid crystal (NLC). In effect a variable focal-length lens, the device absorbs polarized laser light of one wavelength, causing a positive focusing effect for laser light of orthogonal polarization and a different wavelength. The dye selected by the researchers absorbs 633-nm light from a helium-neon (HeNe) laser and moves the focus of a transmitted converging beam of 788-nm light emitted by a diode laser. The NLC is sandwiched and oriented between two parallel glass plates. A polarizing beam combiner sends both beams into the NLC, and a filter after the device passes only the 788-nm light.

By varying the intensity of the HeNe laser from 0 to 10 mW, the researchers can shift the focus position of the beam along the optical axis by 3 cm. They envision replacing the HeNe laser with a second diode laser and postulate using the device in active optical-fiber couplers, laser microscopes, and optical heads for data-storage systems. *Contact Hiroshi Ono at [ono@nagaokaut.ac.jp](mailto:ono@nagaokaut.ac.jp).*