

half vortices have intrinsic degeneracies that can be tapped for quantum computation by moving the half vortices around each other. And because the degeneracy resides in a collective state, coherence is more robust.

For the scheme to work, the energy required to pull apart a half vortex pair must be small. To overcome the troublesome spin-orbit coupling, Das Sarma, Nayak, and Tewari propose an electromagnetic analog of Salomaa and Volovik's thin film idea: Apply a magnetic field to reorient the spins and suppress the coupling.

Five years ago Maeno, Rice, and Sigrist reviewed research on strontium ruthenate for PHYSICS TODAY. The title they picked, "The Intriguing Superconductivity of Strontium Ruthenate," now seems even more apt.

Charles Day

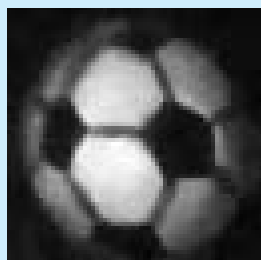
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physics update

Supplementary material related to these items can be found at www.physicstoday.org.

A single-pixel camera has been developed by researchers at Rice University. The device is part of an emerging shift from digital signal processing, in which analog signals are converted into their digital counterparts for processing, to computational signal processing, in which analog signals are fed in some suitable form directly into nonlinear processing algorithms. Instead of data-gathering pixels, the Rice camera uses a digital micromirror device—an array of micromirrors that can each adopt one of two orientations. A lens focuses an image onto the DMD; then the image is



reflected by a randomly chosen subset of the mirrors through another lens and focused onto a single photodiode. The photodiode

generates a voltage that serves as a coefficient for the particular DMD configuration. The image is sampled repeatedly with different DMD configurations, and the collection of measured voltages is processed to reconstruct the image. Typically, many fewer measurements are needed than the number of mirrors in the array, which leads to savings in data storage and processing. For example,

the image of a soccer ball shown here was taken with a 4096-mirror (64×64) camera and 1600 measurements. The tradeoff in the new scheme is between data compression and acquisition time rather than between resolution and number of sensors. Because the camera uses only one sensor (a photodiode in the prototype), the researchers say that "compressive sensing" can be adapted for imaging at wavelengths inaccessible to digital photography. The Rice results were reported at the Frontiers in Optics 2006 meeting of the Optical Society of America held in October in Rochester, New York. (See paper FWN3 among the Wednesday abstracts at <http://www.osa.org/meetings/annual/program/default.aspx>.) —PFS

Element 118 is discovered. At the Joint Institute for Nuclear Research in Dubna, Russia, 20 physicists from JINR and 10 from Lawrence Livermore National Laboratory in the US sent a beam of calcium-48 ions into a target of californium-249 atoms to briefly create three representatives of element 118, which lies just beneath radon in the periodic table and is therefore a kind of noble gas. In separate runs with about 2×10^{19} calcium projectiles each, one atom of element 118 appeared in the year 2002 and two more in 2005; the exhaustive analysis took until now to

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