EDITED BY GILBERT CHIN AND JAKE YESTON

PHYSICS

Snapshot Magnetometry

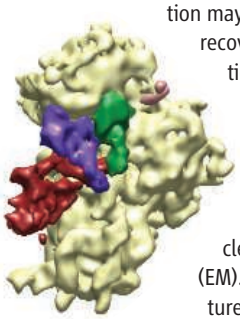
In cold-atom chips, atoms are guided above tracks of wires that supply the magnetic field to keep them aloft. In applications ranging from quantum information processing to metrology, any deviation in the magnetic field from point to point over the chip could influence the delicate state of the atoms. Terraciano *et al.* introduce a technique that takes a snapshot image of the magnetic field landscape. Using a cloud of cold rubidium atoms, whose energy levels are sensitive to magnetic field, they let the cloud fall toward the chip and probe the atoms' state with a laser beam tuned to one of the magnetic transitions. The ability to take a two-dimensional snapshot image of magnetic field variations of 30 mG/cm above the atom chip over 5 mm with 250-μm resolution should prove useful in calibrating these chips for their envisioned applications. — ISO

Opt. Express **16**, 13062 (2008).

BIOCHEMISTRY

Translation Translocations

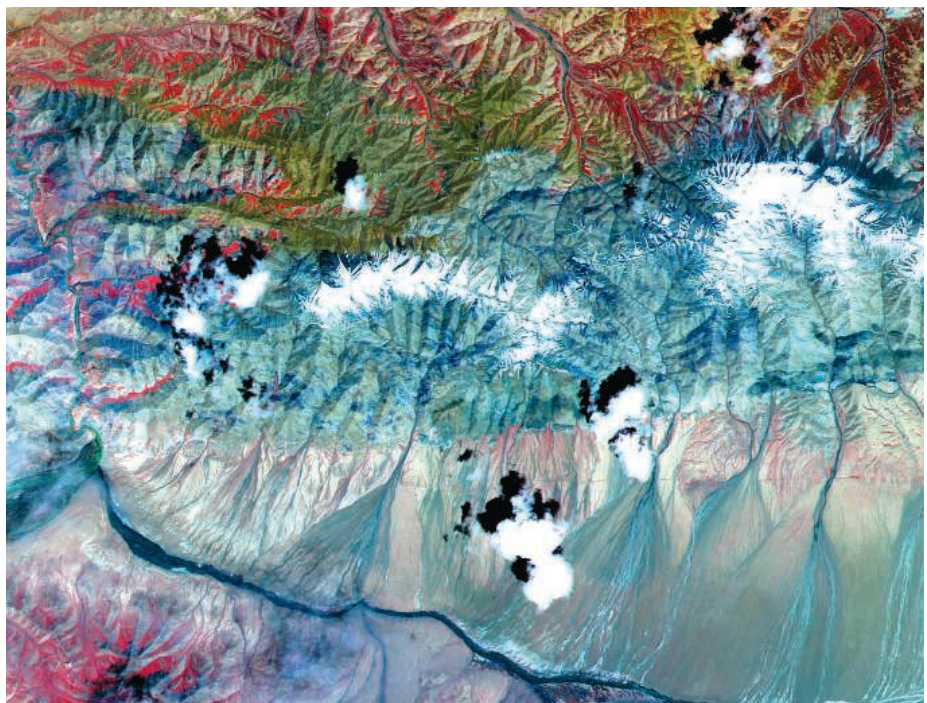
Ribosomes translate mRNA into protein with the help of GTPases: the elongation factors (EFs). In prokaryotes, as each mRNA codon is presented in the A site of the ribosome, EF-Tu loads a complementary, amino acid–bearing tRNA into the A site. After peptide bond formation, EF-G translocates the ribosome along the mRNA strand by three nucleotides, moving the tRNA (now carrying the nascent polypeptide chain) into the neighboring P site and bringing the next codon into the A site. The GTPase EF4/LepA was recently found to promote backward translocation of the ribosome along the mRNA strand, moving the tRNA from the P site back into the A site. This function may allow the ribosome to recover from forward translocations of the wrong number of nucleotides. Connell *et al.* have visualized EF4 in complex with a ribosome and associated tRNAs using single-particle cryo–electron microscopy (EM). Fitting the crystal structure of EF4 into the cryo-EM reconstruction revealed that its C-terminal domain forms multiple contacts with a tRNA in the A site, suggesting that EF4 promotes back-translocation by stabilizing the A-site tRNA position over the P-site tRNA position. — NM*



EF4 (red) grabs the A-site tRNA (purple).

Nat. Struct. Mol. Biol. **15**, 10.1038/nsmb.1469 (2008).

*Nilah Monnier is a summer intern in *Science*'s editorial department.



GEOPHYSICS

Sensing Supershear

Recent observations, supported by experiments, have indicated that some earthquake ruptures transiently exceed the local speed of sound along the fault zone. This "supershear" can explain enhanced shaking from these quakes; thus, supershear ruptures are critical in assessing seismic risks. Many of the details of how ruptures accelerate to above the sound speed and then decelerate, in some cases repeatedly, as a rupture progresses are unclear, as most supershear ruptures have been inferred by data inversions. Vallée *et al.* were able to observe these dynamics more directly in the 2001 Kokoxili earthquake (M = 7.8)—which ruptured 400 km along the Kunlun fault in northern Tibet—thanks to an array of seismometers in Nepal that were nearly parallel to the rupture. Their data show that the earthquake, which began in the west, accelerated to above the shear wave velocity after ripping 175 km eastward, at a bend in the fault. Rupture speeds nearly reached the compressional (p) wave velocity before decelerating at another bend. Much of the high-frequency seismic energy from the quake was radiated during these transitions. — BH

J. Geophys. Res. **113**, B07305 (2008).

CLIMATE SCIENCE

1000 Years of Hurricanes

The natural variability of hurricane activity is poorly known, not least because the historic record for hurricanes extends back only about 130 years. As a result, there has been controversy over whether hurricane activity will change—or is already changing—as a result of global warming. Sediments may hold clues to hurricane activity over longer time scales, but few studies have yielded sedimentary records of hurricane activity at annual resolution. Besonen *et al.* have now obtained an annually resolved lake sediment record from Lower Mystic Lake in Boston, Massachusetts, that covers the past 1000 years. The record contains anomalous features—unusually thick layers in which coarse sediments and terrestrial, organic detritus are overlain by progressively finer sediments—that are indicative of strong flooding. Comparison with the historic record shows that 10 out of 11 of these features

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