

# Ears Tuned to Water

To a bat, flat, horizontal surfaces sound like water

Sounds like water:  
A greater mouse-eared  
bat tries to drink from  
a metal sheet.



Bats can detect streams, ponds and lakes with their ultrasonic sounds because the water surface acts like a mirror: it reflects their calls in such a way that they receive hardly any echo at all. According to Stefan Greif and Björn Siemers from the Max Planck Institute for Ornithology in See-wiesen, bats interpret flat horizontal surfaces as water. When the researchers simulated water surfaces with sheets made of metal, wood and plastic, the 15 bats in the experiment still tried to drink from them.

Although they also use their sight and their senses of smell and touch for identification, echolocation appears to dominate all of these other senses. The researchers now want to find out how the countless numbers of man-made flat surfaces, such as skylights, car roofs and greenhouses, affect bat behavior.

(NATURE COMMUNICATIONS, November 2, 2010)

## The Technical Tricks of a Quantum Key

Commercial suppliers of quantum cryptography close a security loophole

It is possible to encrypt data so that it is absolutely safe – in principle. Quantum cryptography foils anyone who tries to hack into a data line: the hacker can intercept the signals, but can't pass them on without errors. This is because, when the quantum signals are both received and sent, they retain a random characteristic signature. Researchers at the Max Planck Institute for the Physics of Light and the Universities of Trondheim and Erlangen-Nuremberg, however, have shown that existing systems still have a technological weakness: the current signal detectors do not distinguish between weak quantum signals and the bright light pulses on which classical physics is based. This means that a hacker can

dazzle the recipient's signal detector with commercially available devices – a process that goes unnoticed. But the researchers have already developed countermeasures, in a joint venture with the manufacturer ID Quantique.

(NATURE PHOTONICS ONLINE, August 29, 2010)



Hackers on a security mission: Nitin Jain (left) and Christoffer Wittmann test devices that use quantum cryptography to transmit data.

## A Spray to Replace Injections

In the future, it might be possible to administer insulin as a spray via the lungs, rendering inconvenient injections superfluous. A team of researchers, including those working with Helmut M $\ddot{o}$ hwald at the Max Planck Institute of Colloids and Interfaces, has produced loosely packed microspheres of uniform size and shape from insulin and other proteins used in medicine. The micro-particles are thoroughly absorbed by the body, where they release an accurate dose of proteins. To produce these transport vehicles, the researchers first created porous grains of calcium carbonate, the main constituent of chalk. These were mixed with a protein solution and the protein molecules allowed to penetrate the cavities in the chalk. When the researchers varied the pH value, the proteins in the pores flocculated out, the chalk matrix dissolved and the protein shrank into microspheres. (ANGEWANDTE CHEMIE, October 22, 2010)

Image: MPI for the Physics of Light (bottom), Dietmar Nill (top)