number of protons and neutrons, which are organized into shells like those of electrons in atoms. A filled shell confers relative stability, and hassium-270 is doubly magic because it has filled shells of both protons and neutrons.

The team detected four atoms of hassium-270, created by bombarding a curium target with magnesium ions. They estimate its half-life to be 22 seconds, which is remarkably long for such a superheavy atom.

OPTICS

Two goes into one

Phys. Rev. Lett. **97,** 243003 (2006)

An optical trap uses a highly focused laser beam to confine atoms to a cell known as a potential well. Yevhen Miroshnychenko and his colleagues from the University of Bonn, Germany, have now contrived to squeeze two atoms into a well designed for one.

They achieved this unnatural intimacy through deft manoeuvring of two laser beams: one horizontal, used as a conveyor belt to shunt atoms to and fro; and one vertical, that, like a pair of tweezers, plucks an atom out of one well in the horizontal beam and sets it down in another. The two atoms could form a bound molecule, say the authors, or prove to be a useful resource for quantum information processing.

SEISMOLOGY

Traits of tsunami quakes

Geophys. Res. Lett. **33,** L24308 (2006)

The earthquake that caused a deadly tsunami in Indonesia in July 2006 was a classic 'tsunami earthquake', according to a new analysis of seismic records. Such quakes generate tsunamis much larger than some measures of the quakes' size would predict.

The earthquake near the Java trench sent a wave between 5 and 8 metres tall towards the beaches of Java, killing hundreds. Charles Ammon of the Pennsylvania State University, University Park, and his colleagues show that the rupture that caused it propagated slowly over 170–200 kilometres with an average slip of around 8 metres. The relatively long duration of the event (185 seconds) and the geometry of the slip are features shared with previous tsunami earthquakes.

MOLECULAR BIOLOGY

RNA taken to extremes

Proc. Natl Acad. USA **103,** 19490–19495 (2006)

By comparing the genetic sequences of many bacteria, Ronald Breaker and his colleagues at Yale University in New Haven, Connecticut, have identified a bizarre piece of RNA that they have christened an 'ornate, large, extremophilic RNA'.

The name describes its properties: ornate because the RNA appears to adopt an elaborate three-dimensional structure; large because it is 610 nucleotides long, which is sizeable for a stretch of RNA that does not code for protein; and extremophilic because it crops up mainly in bacterial species that live at extremes of temperature, salt concentration or pH.

The weird RNA may contribute to the membranes of these extreme bacteria and help them to live in such harsh environments. Other similar RNAs could turn up now that people know to look for them.

MICROFLUIDICS

Quick route to crystals

Proc. Natl Acad. Sci. USA **103,** 19243–19248 (2006)

X-ray crystallography can determine the structure of biological molecules, but only if high-quality crystals of the molecule can

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be grown. Rustem Ismagilov and his co-workers at the University of Chicago, Illinois, present a microfluidics approach to screening crystallization conditions.

Conventional methods can be time-consuming and require large amounts of the target protein. By contrast, using the new scheme one researcher was able to set up 1,300 crystallization trials in 20 minutes using only 10 microlitres of a protein solution.

The team injected droplets of the solution into a capillary along with another reagent in a way that allowed the reagent and its concentration to be varied in each 'plug' (the picture above shows a 1-metre-long capillary containing around 1,000 plugs). The plugs were then screened to see which conditions gave the best crystals.

JOURNAL CLUB

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Childhood memories cause a nanotechnologist to go nuts for plant-derived nanomaterials.

As a child growing up in Kerala, southern India, I marvelled at the unusual cashew fruit, with its kidney-shaped nut dangling from a swollen apple.

Since then, nanotechnology has become my passion. So it was with a curious mix of scientific interest and childhood memories that I read a recent paper describing how nanomaterials could be derived from plant sources such as the cashew nut.

I had never thought of a cashew nut as anything more than a food item. However, a little research reveals that cashew-nut-shell liquid, rich in natural long-chain phenols, already has applications ranging from hydrophobic coatings to anti-ageing creams.

George John and Praveen Kumar Vemula at the City College of New York, in their recent article (G. John & P. K. Vemula *Soft Matter* **2,** 909–914; 2006), show how cashew-nut-shell liquid can also serve as a starting material for a variety of nanostructures.

The oil contains molecules that have phenol groups for heads, and long hydrocarbon tails. These can form structures such as lipid nanotubes and twisted nanofibres.

To make this happen, the molecules' structure is first modified by attaching water-loving sugar groups to the phenols. The cooperative effect of head groups hydrogen bonding and the hydrophobic interactions of the tails leads the molecules to self assemble into bilayers. These then further organize into the fibres and tubes.

Using a similar strategy, it should be possible to develop a wide range of novel soft nanomaterials from other plant resources. The breadth of precursors available in our plants and crops should inspire all nanotechnologists — not just those fond of cashew nuts.