

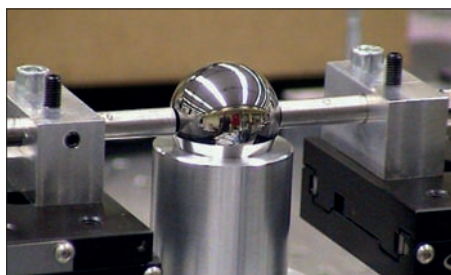
Sciencewatch

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The ups and down of friction

The exact nature of friction is still somewhat mysterious, despite having long been studied by many physicists and engineers. In the 17th century, Guillaume Amontons and Charles-Augustin de Coulomb attributed friction to tiny surface irregularities that mesh and impede horizontal motion, necessitating frequent vertical motions. These ideas fell somewhat to the wayside in more recent adhesion-based theories of friction but they have recently received renewed support from Farid Al-Bender and colleagues at the Katholieke Universiteit Leuven.

These researchers used nanoscale



techniques to measure hysteresis curves in the normal displacement (perpendicular to the surface) of a sliding object as it is pushed along. They tested various materials (paper, plastic and brass) at different speeds,

Nanomeasurement instruments can detect movement to a billionth of a metre. (Image credit: KU Leuven.)

recording the curves of the up-and-down motion of the object as it rises and falls over small irregularities. Remarkably, this phenomenon – known as lift-up hysteresis – does not appear to have been shown before. Its measurement shows the complexity of friction and, say the researchers, confirms the intuition of Amontons and Coulomb.

● Further reading

F Al-Bender *et al.* 2012 *Tribol. Lett.* **46** 23.

Earthshine and life on other worlds

One way to look for life on other planets is to look at spectroscopic signals of the chemical composition of their atmospheres, searching for compounds such as methane or molecular oxygen, which are likely to be produced by living things. The catch so far has been that the light from exoplanets is faint compared with that emitted by the stars they orbit. Now, Michael Sterzik of the European Southern Observatory in Santiago and colleagues have a clever proposal. Light that comes through an atmosphere becomes polarized, allowing it to be separated from unpolarized background.

The researchers tested this idea with the Focal Reducer/Low-Dispersion Spectrograph at the Very Large Telescope in Chile, looking at earthshine reflected from the Moon. They were able to find signatures of oxygen, ozone and water and indications of vegetation, as well as the fractional contributions of clouds and ocean surface. This technique could offer a new way of studying distant planets and searching for life even before there is a means to go there for a more direct look.

● Further reading

MF Sterzik *et al.* 2012 *Nature* **483** 64.

Alcohol helps fruit flies

People who drink a little whisky in the hopes of helping a cold may be surprised to find that fruit flies do something similar. Neil

Ice-age plant resurrected



Silene stenophylla regenerated from tissue of fossil fruit. (Image credit: S Yashina *et al.*)

It may not be quite the same scenario as in *Jurassic Park*, but Svetlana Yashina and colleagues at the Russian Academy of Sciences in Puschchino managed to resurrect a 30,000-year-old Ice Age flowering plant. They recovered fruit tissue of the plant (*Silene stenophylla*) from a fossilized squirrel burrow 38 m underground near the Kolyma river in Siberia.

By using growth hormones, the team managed to start the cells dividing again and were able to grow viable plants that actually bloomed. This sets a new record, shattering the previous record for a 1200-year-old lotus, which was grown in modern times.

● Further reading

S Yashina *et al.* 2012 *Proc. Nat. Acad. Sci.* **109** 4008.

Milan of Emory University in Atlanta and colleagues raised fruit-fly larvae infected with parasites from a wasp that lays eggs in them. As many as 80 per cent of the infected larvae favoured alcohol-laced food, which can kill off the parasites, as opposed to just 30 per cent of the noninfested ones. Even

better for the fruit flies, the wasps avoided laying eggs in the alcoholic larvae.

Fruit flies also seem to treat psychological problems with alcohol. Galit Shohat-Ophir and colleagues at the University of California in San Francisco found that male fruit flies are more likely to choose food laced with alcohol after being rejected by a mate (something that might strike a chord in humans). Alcohol seems to raise levels of neuropeptide F, a brain chemical that also rises after mating. The work suggests treatments for human alcoholism and depression by raising levels of neuropeptide F, the human analogue of neuropeptide F.

● Further reading

N F Milan *et al.* 2012 *Current Biology* **22** 488.

G Shohat-Ophir *et al.* 2012 *Science* **335** 1351.

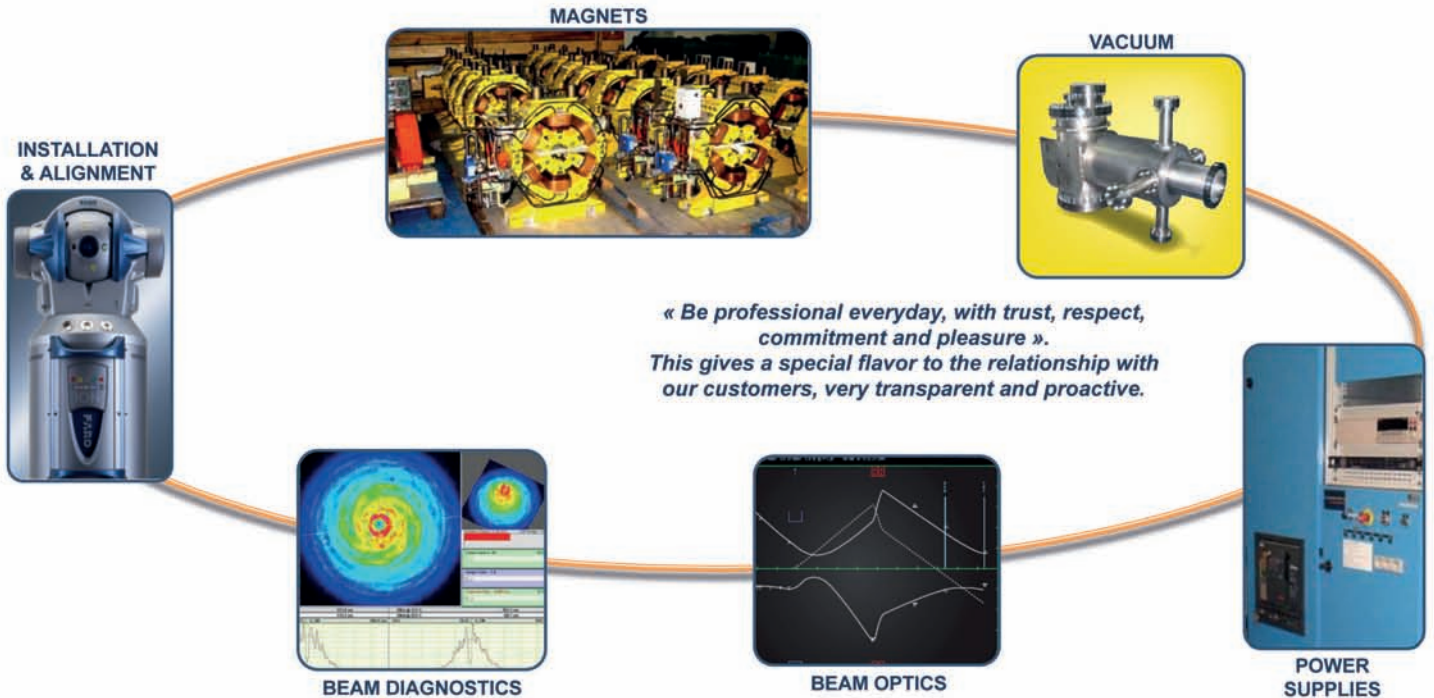
Storing hydrogen in acid

A big challenge in using hydrogen for energy is how to store it. Jonathan Hull of Brookhaven National Laboratory and colleagues have shown that hydrogen can be stored in an aqueous solution of formic acid, the acid that burns in ant stings. At normal temperatures and pressures – a big plus for this technique – an iridium catalyst can make hydrogen react with carbon dioxide to make formic acid under slightly alkaline conditions. Acidifying the solution releases pure hydrogen gas at high pressures.

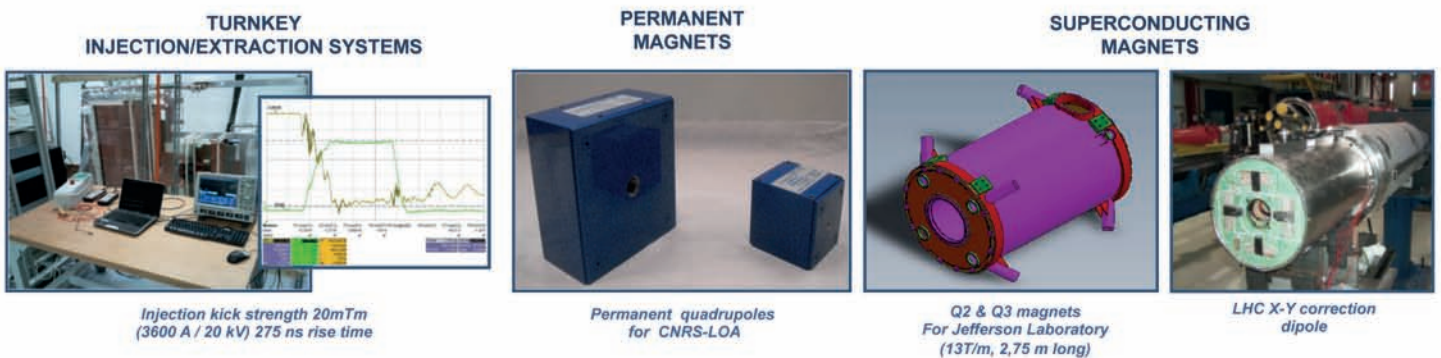
● Further reading

J F Hull 2012 *Nature Chemistry*, doi:10.1038/nchem.1295.

PARTICLE BEAMLINES



MAGNETIC SYSTEMS



SOME REFERENCES

EUROPE : ALBA, ANKA, BESSY, CEA, CERN, DESY, DIAMOND, GANIL, GSI, IN2P3, INFN, LMUM, PSI, Sincrotrone Trieste, SOLEIL, STFC, STUTTGART Univ., UCL
NORTH AMERICA : ANL, BNL, CLS, Fermilab, JLAB, MIT, ORNL, SLAC, Triumf
ASIA : China, India, Japan ; And also : Ithemba in South Africa