RESEARCH HIGHLIGHTS

Why horses wear white

Proc. R. Soc. B doi:10.1098/rspb.2009.2202 (2010)

White horses are more susceptible to skin cancer and predation than their darker kin, but their coats seem to protect them from another danger: pathogen-bearing horseflies.

Gábor Horváth at Eötvös University in Budapest and his colleagues tracked the landing frequency of horseflies on horses of different colours. The flies preferred black and brown horses. When the team covered horse models in transparent glue, more than 15 times as many horseflies stuck to dark models as to white ones.

The authors found that, unlike white horses, dark-coloured horses reflect polarized light, which horseflies can detect. A brown matt cloth attracted horseflies only if it was covered by a transparent, light-polarizing sheet, demonstrating that polarized light, not dark colour, draws the flies.

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PALAEONTOLOGY

Do the locomotion

Geology **38,** 123–126 (2010)

Fossilized paths suggest that, 565 million years ago, animals actively moved around — the oldest evidence for locomotion yet.

Alexander Liu at the University of Oxford, UK, and his colleagues describe narrow tracks up to 17.2 centimetres long found in mudstone slabs from Mistaken Point in southeastern Newfoundland, Canada. The slabs, once part of a sea floor one kilometre deep, are believed to preserve remnants of bottom-anchored suspension feeders.

The discovery suggests that these organisms moved to forage or avoid environmental stresses in a period before the 'Cambrian explosion' of invertebrate animals, which began some 20 million years later.

QUANTUM CHEMISTRY

Never too cold

Science **327,** 853–857 (2010)

Even when molecules are cooled to near absolute zero, chemical reactions can proceed at high rates, propelled by the strange laws of quantum mechanics. So say Deborah Jin and Jun Ye of the University of Colorado in Boulder and their colleagues.

The team cooled a gas of diatomic molecules comprising one potassium and one rubidium atom (KRb) to a few hundred nanokelvin, yet chemical reaction rates — where two molecules collided to produce K_2 and Rb_2 — could still be measured. Flipping the nuclear spin of some of the molecules increased the rates by a factor of between 10 and 100.

The researchers found that long-distance quantum effects — whereby atoms interact at a distance through quantum-mechanical tunnelling before being swapped in close-range collisions — strongly influenced the reaction rates.

PHYSICAL CHEMISTRY

Surface designers

Angew. Chem. Int. Edn doi:10.1002/anie.200905827 (2010)

Molecules tumbling out of solution onto surfaces often self-assemble into ordered nanometre-scale patterns. For the first time, one such delicate assembly has been repeatedly switched back and forth between two designs.

Paolo Samorì at the University of Strasbourg in France, Gian Piero Spada at the University of Bologna in Italy and their colleagues used a scanning tunnelling microscope to watch a modified form of guanine, dissolved in a tiny amount of solvent, form ribbons on a graphite surface (pictured below, left). After the authors added potassium ions, the guanine clustered in a quartet pattern (right). Adding another chemical, a cryptand, reverted the surface structure to the original ribbon-like pattern. The designs could be switched reversibly for hours.

GENETICS

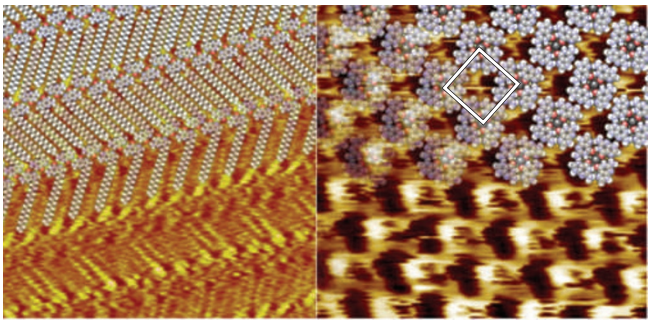
Two strikes

Nature Genet. doi:10.1038/ng.534 (2010)

A chunk of DNA missing from chromosome 16 has been linked to intellectual disability.

Evan Eichler at the University of Washington in Seattle and his colleagues report a rare deletion of 520,000 base pairs from the chromosome. The deletion was present in 42 of 21,127 children with intellectual disability, but only 8 of 14,839 children of normal ability.

Some of the children had additional genetic defects, and were more severely disabled. This supports a 'two-hit' model that could explain why children with only the chromosome 16 deletion had a lower degree of impairment. Further analysis of different genetic defects suggests that this two-hit model extends to other neuropsychiatric conditions.



WILEY-VCH

CONDENSED MATTER

Cutting it fine

Appl. Phys. Lett. **96,** 053107 (2010)

Atomically thin sheets of carbon called graphene are revered for their unusual electrical properties (see Journal Club). Now graphene has competition: Alexander Balandin and his colleagues at the University of California, Riverside, have found