

RESEARCH HIGHLIGHTS

NANOMATERIALS

Squid suckers scrutinized

Adv. Mater. doi:10.1002/adma.200801197 (2009)

The fearsome suckers with which the Humboldt squid (*Dosidicus gigas*) clutches its prey are lined with toothed rings. David Kisailus at the University of California, Riverside, Henrik Birkedal at the University of Aarhus in Denmark and their colleagues have peered into the jaws of these suckers to find out what makes them so strong.

The sucker rings have sharp teeth made from parallel tubes that are hollow near the circular base and filled at the sharp end. This channel-like structure directly affects the mechanical properties of the sucker rings, the authors say, adding extra grip and shear strength for terrorising prey.

Surprisingly, the sucker rings don't contain chitin, usually present in the shells of crustaceans. The sucker rings' major amino acids are glycine, tyrosine and histidine. The authors propose that hydrogen bonds between histidine residues give the rings their rigidity.

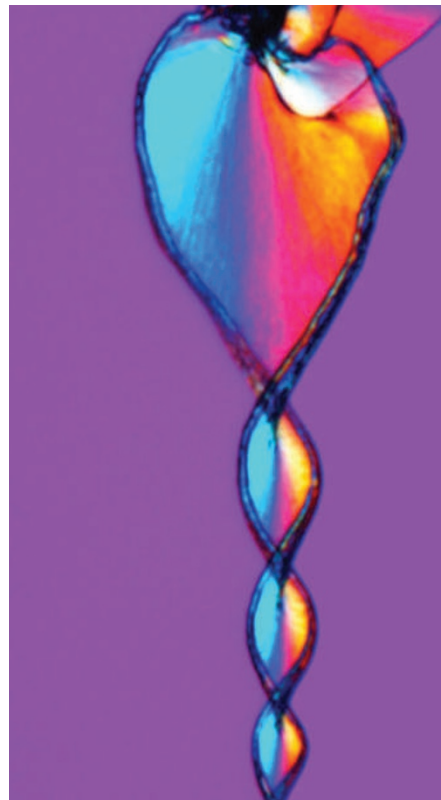
QUANTUM LOGIC

Blockade boost

Nature Phys. doi:10.1038/nphys1183 and doi:10.1038/nphys1178 (2009)

The groups of Antoine Browaeys of the University of Paris-South in Palaiseau and Mark Saffman of the University of Wisconsin, Madison, have independently demonstrated a simple set-up that could form the basis of a quantum logic gate, a system that has the advantage of having components widely separated enough to be easily addressable one at a time.

Their Rydberg blockades hold rubidium atoms in optical traps several micrometres



Getting their morph on

Science 323, 362–365 (2009)

Some precipitates take regular, sinuous and oddly lifelike forms, and are known as biomorphs. Juan Manuel García-Ruiz of the University of Granada, Spain, and his colleagues describe an intriguing chemical feedback mechanism that creates the microcrystals responsible. In biomorphs built from barium carbonate crystals, the formation of these elongated crystals has the effect of locally reducing pH, which allows the precipitation of silica onto the crystals, halting their growth and defining their shape. The properties of these microcrystals, which the authors observed using time-lapse video microscopy and electron microscopy, are responsible for the smooth curves and furled edges of the biomorphs.

The work opens the way for new approaches to the synthesis of biological and biomimetic materials, and to the exclusion of false positives when looking for life-like forms in poorly characterized environments.

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apart. Lasers are used to excite an electron in one atom to an extent that blocks its neighbour from achieving a similar excited state. The next step will be to demonstrate useful entanglement by creating a working logic gate with the blockade.

PALAEOLOGY

Herd of hearing

Proc. R. Soc. B doi:10.1098/rspb.2008.1390 (2009)

If you want to know what *Archaeopteryx* sounded like, a first step is to work out what it could hear.

Working with specimens of 59 extant species of reptile and bird (including the barn owl, skull pictured left), Paul Barrett of London's Natural History Museum and his colleagues measured the length of a duct found in the bony part of the inner ear. They show that this length correlates with the hearing range and best hearing frequency of the animals, and can also be used as a guide to the complexity of their calls.

This relationship allows the first quantitative assessment of the hearing ability of extinct species: *Archaeopteryx* seems to have been a fair match for the emu in this regard. More data may allow inferences to be made about the bird's vocalizations, and thus reveal what sort of social structure it lived in.

NEUROLOGY

Serotonin and social anxiety

PLoS One 4, e4156 (2009)

Certain versions of a key gene for the brain regulator serotonin disproportionately predispose those with a history of childhood abuse to depression and alcoholism.

Rhesus macaques and humans have similar variation in the serotonin transporter gene. Work by Karli Watson of Duke University in Durham, North Carolina and two colleagues shows that the animals show similar behaviour if they possess one 'short' version of the gene. These macaques demonstrated the simian equivalent of social anxiety by avoiding looking at pictures of faces, and particularly avoiding looking them in the eye.

PLANETARY SCIENCE

Martian methane

Science 10.1126/science.1165243 (2009)

The detection of methane in the atmosphere of Mars five years ago was a surprise, because the gas is not stable under Martian conditions. Michael Mumma at NASA's Goddard Space Flight Center in Greenbelt, Maryland, one of those who made the initial reports, and his colleagues now provide

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