

## RESEARCH HIGHLIGHTS

**Warning wings**

*Proc. R. Soc. B* doi:10.1098/rspb.2009.1110 (2009)

The sound made by feathers may make for a useful warning signal when birds flock together.

Mae Hingee and Robert Magrath at the Australian National University in Canberra studied the crested pigeon, *Ocyphaps lophotes* (pictured), which makes a fluttering metallic

sound when it flaps its wings. From recordings, they found differences between the sounds of this wing 'whistle' during normal take-offs and those of panicked flights made in response to a threat.

They then played back the sounds to groups of pigeons. Calm take-offs had no effect, but recordings of alarmed birds frequently sent flocks scattering.

**ATMOSPHERIC CHEMISTRY****Ozone's winners and losers**

*Nature Geosci.* doi:10.1038/ngeo604 (2009)

Changes in atmospheric circulation driven by global warming could shift the global distribution of ozone northwards.

Michaela Hegglin and Theodore Shepherd at the University of Toronto in Canada isolated the effects of global warming by simulating ozone interactions in an atmospheric chemistry climate model. They focused on the decades 1960–70 and 2090–2100, representing periods before and after the most severe effects of ozone-depleting chemicals. Climate change increases tropical upwelling, pushing ozone into northern latitudes. At the same time, southern latitudes see a decrease in ozone transport.

As a result, the authors report that by the end of this century ultraviolet radiation could decrease by 9% at high northern latitudes; tropical regions could see an increase of 4%; and southern high latitudes could receive up to 20% more in the late spring and early summer.

**PHYSICS****Magnetic monopoles**

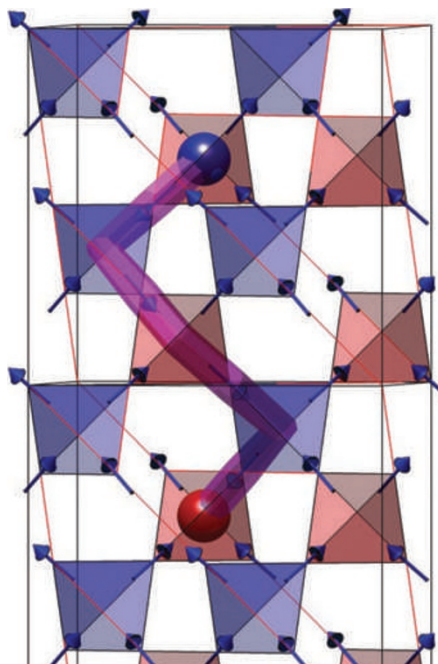
*Science* doi:10.1126/science.1178868; 10.1126/science.1177582 (2009)

Physicists have searched for decades for magnets with a single pole. Now, two independent groups report the latest signatures of magnetic monopoles in a class of crystalline materials called spin ice. When the crystals were chilled to near absolute zero, they seemed to fill with tiny single points of north and south separated by fractions

of a nanometre. Jonathan Morris at the Helmholtz Centre for Materials and Energy in Berlin and his colleagues used  $Dy_2Ti_2O_7$ , whereas Tom Fennell at the Institute Laue–Langevin in Grenoble, France, and his collaborators used  $Ho_2Ti_2O_7$ .

The atoms in the crystals sit at the corners of tetrahedra. Each atom behaves like a tiny bar magnet, and when the crystal is cooled, the atoms align to create regions of north or south magnetic charge, separated by a chain of aligned atoms (see image, below). The charge isn't attached to any physical object, but it behaves like a monopole.

**For a longer story on this research,** see <http://tinyurl.com/monopole>

**COMPUTATIONAL BIOLOGY****A new protein subdivision**

*Cell* 138, 774–786 (2009)

The traditional hierarchy of protein structure might require revision. Rama Ranganathan at the University of Texas Southwestern Medical Center in Dallas and his colleagues propose that proteins contain semi-independent clusters of co-evolving amino acids that they call 'protein sectors'.

The researchers analysed the conserved biological properties of the S1A protein family. They found that the proteins' amino acids are organized into three conserved functional units that are distinct from the classically observed structural hierarchies based on sequence or three-dimensional shape. As such, the authors argue, natural selection may operate at the level of these protein sectors.

**MICROBIAL EVOLUTION****Cholera gene swap**

*Proc. Natl Acad. Sci. USA* 106, 15442–15447 (2009)

Cholera has affected humans for more than a hundred years, but how the bacterium that causes the disease, *Vibrio cholerae*, has evolved had not been described.

Rita Colwell of the University of Maryland in College Park and her collaborators compared the genomes of 23 strains of the bacteria isolated over the past 98 years. They found that the strains responsible for the current cholera pandemic, which started in 1961, are descendants of a single strain, and evolved mainly through gene transfer with other strains in the environment. The culprits behind the previous pandemic, in the early