RESEARCH HIGHLIGHTS

Selections from the scientific literature

CANCER GENETICS

Exploding DNA goes back together

The mysterious giant chromosomes found in some cancers are formed when DNA shatters and recombines.

Neochromosomes are made up of pieces of the 46 chromosomes that each human cell normally carries. To study how they form, a team led by Anthony Papenfuss at the Walter and Eliza Hall Institute of Medical Research in Melbourne and David Thomas of the Garvan Institute of Medical Research in Sydney, both in Australia, sequenced the DNA of neochromosomes isolated from liposarcomas.

They used a mathematical model to show that certain cancer genes can drive normal chromosomes — in particular chromosome 12 — to break into pieces and reform as circles. The circles, which carry cancer genes, grow in size as certain genes become amplified, and eventually split to form giant linear chromosomes.

A drug targeting genes that drive this process could kill the cancer cells, the team proposes.

Cancer Cell 26, **653–667 (2014)**

NEW J. PHYS./IOP PUBLISHING

PHOTONICS

Twisty light sends images across Vienna

Beams of light twisted into a corkscrew shape have carried data more than 3 kilometres over Vienna's skyline in an effort to increase the information-carrying capacity of electromagnetic waves.

Adding orbital angular momentum (OAM) to laser beams — when fluctuations of light waves are staggered along different parallel rays — can produce a theoretically infinite range of corkscrew patterns or modes. Mario Krenn and Anton Zeilinger at the University of Vienna and their colleagues used green laser light (pictured) with 16 different OAM modes to send data from a radar tower to a small detector across the city. They successfully transmitted small black-and-white pictures of Wolfgang Amadeus Mozart and other famous Austrians. The experiment showed that OAM modes can survive much longer trips through the atmosphere than expected.

New J. Phys. 16, **113028 (2014)**

BIOTECHNOLOGY

Mind manipulates gene expression

Human brain activity has been harnessed to control gene expression in mice.

Martin Fussenegger at the Swiss Federal Institute of Technology in Zurich and his colleagues created a small, implantable cartridge containing human cells engineered to produce a protein called SEAP when exposed to light. The researchers then put this cartridge under the skin of a mouse, along with a light-emitting diode (LED).

When trained volunteers transmitted certain brain-activity patterns through a headset to a computer, the machine switched on an electrical-field generator under the mouse. The field powered up the LED implanted in the mouse, causing the cells in the implant to produce SEAP, which then passed into the bloodstream.

The device could be programmed to respond to human brain activity that predicts a seizure, for example, and prevent the episode by delivering a drug to the brain, the authors say.

Nature Commun. 5, **5392 (2014)**

ANIMAL BEHAVIOUR

Eyespots shift predators' attack

Eye-shaped markings at the edges of butterfly wings stop predators from striking vital body parts.

Kathleen Prudic, now at Oregon State University in Corvallis, and her team let praying mantids (*Tenodera sinensis*) feed on *Bicyclus anynana* butterflies, which have small, drab eyespots in the dry season and larger, brighter spots in the wet season.

The mantids more readily detected wet-season butterflies than dry-season ones, but were less successful at capturing them because they tended to attack the wings rather than the body. Butterflies with wet-season wings lived longer and laid more eggs in the presence of mantids than did their dry-season fellows.

Even dry-season butterflies with large bright spots pasted on their wings showed these fitness benefits.

Proc. R. Soc. B 282, **20141531 (2014)**

MATERIALS

Molecular fan opens under light

Researchers have constructed micrometre-sized, stacked layers that slide open like a