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colleagues, might eventually be able to halt any atom that has an unpaired electron. Slowed atoms could then be held in a magnetic trap.

Containing and cooling atoms in this way could lead to the study of a process such as β -decay in tritium, which has never been trapped before.

COSMOLOGY

Separated by birth

Astron. J. **135**, 1106–1116 (2008)

The Small Magellanic Cloud is 2 billion or 3 billion years younger than the Milky Way and other nearby galaxies, a finding that suggests the galaxies of the early Universe did not form all at once, as had been previously thought.

The Small Magellanic Cloud is a dwarf galaxy about 200,000 light years from the Milky Way (pictured above). Katharina Glatt from the University of Basel, Switzerland, and her colleagues determined the age of its oldest star cluster using images taken by the Hubble Space Telescope.

Although other, older star clusters in the dwarf galaxy might have existed but not survived, the authors conclude it is more likely that star formation in the Small Magellanic Cloud began much later than imagined.

ZOOLOGY

Croc 'n' roll

J. Exp. Biol. doi:10.1242/jeb.015339 (2008)

Alligators use muscles normally employed in breathing to shunt their lungs around like a buoyancy aid, enabling them to perform death-rolls and dives.

Todd Uriona and C. G. Farmer at the University of Utah in Salt Lake City discovered the secret of these manoeuvres by implanting electrodes in young alligators' diaphragm, pelvic, abdominal and rib muscles. These recorded how the creatures worked those muscles to shift the lungs towards the tail during a dive — and then back towards the head to resurface. The same muscles move the lungs sideways when the alligator wants to roll.

PALAEONTOLOGY

Righting the rings

Nature Geosci. doi:10.1038/ngeo128 (2008)

Palaeoclimate researchers can now use tree-ring records to make more precisely dated measurements further back than 12,400 years, he original maximum. Raimund Muscheler of Lund University in Sweden and his team used comparisons with isotopic data from ice cores to ascertain the true age

of more ancient tree-ring chronologies that until now had 'floated' in time.

The abundances of both carbon-14 and beryllium-10 vary with solar activity. The researchers used this correlation to link the floating tree-ring records, which contain carbon-14, to a period chronicled in ice cores from Greenland, which are dated by their beryllium-10 content.

ECOLOGY

Better than bleaching

Proc. R. Soc. Lond. B doi:10.1098/rspb.2008.0069 (2008)

A shift in the composition of their symbiotic algae can enable corals to acclimatize after periods of higher water temperatures leave them 'bleached'.

Ray Berkelmans of the Australian Institute for Marine Sciences in Townsville, Queensland, and his colleagues monitored the types of zooxanthellae inside the coral *Acropora millepora* on the Great Barrier Reef before and after natural bleaching. They report a dramatic reshuffling of the symbiotic community within the surviving coral: of the colonies with predominantly heat-sensitive algae before bleaching, 71% had predominantly heat-resilient varieties a few months later.

JOURNAL CLUB

Moty Heiblum

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A physicist applauds evidence for the quantum spin Hall effect.

I have been fascinated by the ballistic (collisionless) motion of charge carriers in solids since the start of my career. In practice this motion is often impeded by unavoidable impurities in the solid. But when it works, the charge carriers maintain their quantum properties while dissipating a minimum amount of energy.

Applying a strong magnetic field perpendicular to a two-dimensional conducting layer can accomplish the feat. Then, the quantum Hall effect kicks in, forcing the charges to the edges of the sample where they skip along in so-called 'chiral edge channels'. Backward scattering is virtually eliminated because that would require the charges to find a way to the opposite edge, where charges move in the opposite direction.

Recently, Laurens Molenkamp of the University of Würzburg in Germany and his colleagues took a step towards verifying the quantum spin Hall effect (M. König *et al.*

Science 318, 766–770; 2007). This is where chiral edge channels form spontaneously in semiconductor insulators with peculiar electronic structures — namely, where the valence band is energetically higher than the conduction band because of the strong spin-orbit interaction between electron spins and electron velocities. This means that spin-up electrons are carried only by edge channels moving in one direction and spin-down electrons are carried by edge channels moving in the opposite direction.

Molenkamp's team used a thin layer of mercury telluride

sandwiched between two layers of mercury cadmium telluride. Because measuring spin current is difficult, they recorded the conductance of this middle layer to verify the ballistic transport that characterizes edge-channel transport. It was quantized, as predicted.

With further verification, the finding could lead to low-power devices based on the transport of spins rather than charges. Thus a quirk in the scientific field I have always loved might find a practical application.

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