

RESEARCH HIGHLIGHTS

Selections from the scientific literature

ASTROPHYSICS

Supernova glow shows stellar twin

The force of an exploding star may have ripped material off an orbiting companion star, leaving behind a signature glow.

Astronomers first spotted the massive explosion of supernova iPTF13ehe in 2013. Two years later, they noticed an afterglow coming from clouds of hydrogen nearby. Takashi Moriya at the University of Bonn in Germany and his colleagues argue that this unexpected light came from material that was torn off another star during the violent original outburst. The energy from the blast could have blown away part of a tightly orbiting companion star, stripping off a mass of hydrogen that could weigh nearly as much as the Sun.

Careful scrutiny of hydrogen emissions from other especially bright supernovae could determine whether this radiance stems from companion stars or matter that is already present in the surrounding interstellar space. *Astron. Astrophys.* 584, L5 (2015)

NEUROSCIENCE

Alzheimer's role of breast-cancer gene

The DNA-repair protein BRCA1 is known to increase the risk of breast and ovarian cancer when it is mutated. But the normal protein might also have a central role in Alzheimer's disease.

Elsa Suberbielle and Lennart Mucke at the Gladstone Institute of Neurological Disease in San Francisco, California, and their colleagues lowered BRCA1 protein levels in mouse brains by blocking the *BRCA1* gene using a small

piece of RNA. They found that some neurons shrank in size and that the animals had a reduced ability to learn and remember their way around a maze. The researchers also showed that BRCA1 levels were depleted in the post-mortem brains of people with Alzheimer's. By looking at this process in cultured neurons and in mice, the authors suggest that BRCA1 is degraded when amyloid- β proteins accumulate in the brain in Alzheimer's disease. *Nature Commun.* <http://doi.org/9kk> (2015)

GEOPHYSICS

Earth's magma in a spin

The rapid spin of the early Earth could have influenced the way that the planet solidified.

Some 4.5 billion years ago, Earth was extremely hot, covered by a molten magma ocean, and completed a full rotation in a few hours. Christian Maas and Ulrich Hansen of the University of Münster in Germany calculate that the fast rotation could

have influenced how crystals settled from the magma ocean and shaped Earth's interior. They used a three-dimensional model of the formation of silicate crystals in magma, and found that a fast rotation rate created a crystal layer that settled deeper beneath the poles than under the equator.

This could have played a key part in how Earth's mantle layer eventually solidified out of the magma ocean, say the authors. *J. Geophys. Res. Solid Earth* <http://dx.doi.org/10.1002/2015JB0121053> (2015)



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ENVIRONMENTAL SCIENCES

Ecological toll of African infrastructure

Huge development projects such as roads and railways that are planned or under construction in Africa threaten swathes of its ecosystems.

William Laurance and his team at James Cook University in Cairns, Australia, mapped 33 'development corridors' that are being upgraded or planned, plus their human populations and surrounding lands. They found that these corridors would stretch 53,000 kilometres and cut through 408 protected areas, 29 of which would be cut

by two or more corridors.

Corridors are often justified on the basis of their benefits to agricultural production, but the team found just five that would have both low environmental impact and large agricultural benefit. Six would degrade areas with high conservation value and bring low agricultural benefits, and the rest would bring only "marginal" returns. Many of the developments would cause serious and irreversible damage. *Curr. Biol.* <http://doi.org/9kg> (2015)