

Physical Review Focus

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COLD FINGERS

For more than half a century, scientists and polar explorers have puzzled over the origin of serrated zipper-like patterns that sometimes form when floating ice sheets collide. In the 23 February Physical Review Letters, physicists give the first theoretical explanation for these formations. The same mechanism may have a role in shaping the boundaries of tectonic plates, the researchers suggest, and might be used to create structures as small as the gears of a nanomachine. (Dominic Vella and J. S. Wettlaufer, *Phys. Rev. Lett.* **98**, 088303.)

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STAYING ALIVE

Mathematical models often predict that predators will hunt their prey to extinction or that predators will starve to extinction when the prey population drops. Real species are far more stable, in part because the animals live in many spatially separated areas that can replenish one another through migration. But this result has been difficult to recreate in mathematical models, and researchers haven't understood exactly which conditions prevent extinction. In the 2 March Physical Review Letters, a team describes a stable model that includes migration and determines the precise mechanism that prevents extinction. The study could be helpful for designing conservation strategies and in medicine, the researchers say. (Refael Abta *et al.*, *Phys. Rev. Lett.* **98**, 098104.)

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 13 March, 2007*

TURNING STARLIGHT INTO GAMMA RAYS

Extremely high energy gamma rays coming from a region in the constellation Cygnus have stumped astronomers. But in an upcoming issue of Physical Review Letters, researchers propose that the mysterious rays are produced by fast-moving nuclei that give a "double boost" to ultraviolet photons from stars, multiplying their energy one trillion times. The model may also account for high-energy nuclei seen in cosmic rays that rain down on Earth from all directions. (Luis A. Anchordoqui *et al.*, *Phys. Rev. Lett.* to be published.)

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FILTER PHYSICS

A colander is supposed to trap any objects larger than its holes, but for some sieves, even objects smaller than the holes get caught. The phenomenon is common, from swimming pool filters to the soil and rocks that filter underground oil. In the 16 March Physical Review Letters, a team describes a theory that predicts the conditions for the "clogged filter" effect and verifies it with experiments. They believe that extensions of the theory could apply to a wide variety of natural and artificial filters. (N. Rousset *et al.*, *Phys. Rev. Lett.* **98**, 114502.)

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 2 April, 2007*

FASTER CRUNCHING THANKS TO EINSTEIN

Relativity theory insists that no matter what speed you choose for your spaceship – snail-like or close to light speed – the laws of physics always look the same. Yet in the 30 March Physical Review Letters, a theorist reports that the complexity of physics calculations is not the same at all speeds. Merely imagining particle interactions from a speeding spaceship's point-of-view could dramatically accelerate computer calculations, especially for phenomena involving particles moving close to light speed. The discovery of such a simple but unnoticed effect of relativity theory is surprising to many researchers, in part because the theory is so well-studied. (J.-L. Vay, *Phys. Rev. Lett.* **98**, 130405.)