CONTENT



When Mongolian gazelles gather on green pastureland, some 100,000 animals can easily come together. Afterwards, they scatter in all directions. Animal ecologist Thomas Müller is investigating why that is.



COMPUTER LEARNS TO RECOGNISE MOVEMENTS

Self-learning programmes should help artificial intelligence systems to distinguish movements. For training, they use 100 million YouTube videos showing, for example, cooking instructions.



OBSERVING THE IMPOSSIBLE

With the COLTRIMS reaction microscope, phenomena from the quantum world can be observed in molecules: two movements that are in fact mutually exclusive – and whose waves nonetheless overlap.

SPOTLIGHT

4 Physics education researcher recommends stroboscope images for physics lessons

MOTION WITH CONSEQUENCES

 Animal migration in the "Serengeti of the East" The extraordinary migratory behaviour of the Mongolian gazelle poses major challenges for nature conservation

By Markus Bernards

- 12 Ocean sunshade How clouds influence climate change By Andreas Lorenz-Meyer
- 16 When cancer cells migrate How metastases develop in the brain By Anja Störiko

FASTER AND FASTER

- 21 The unmoved mover How the tiniest particles approach the speed of light By Dirk Eidemüller
- 25 Video recognition: Spot the difference? By Markus Bernards
- 28 Tickling Schrödinger's cat When a molecule flies apart and stays bound at the same time By Dirk Eidemüller

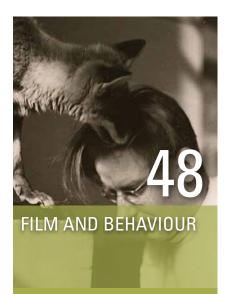


Over two years, researchers have studied how sports clubs can help with immigrant integration. Conclusion: voluntary work needs concrete support.



MAGNESIUM WAS YESTERDAY

To relieve professional athletes and other sufferers from annoying muscle cramps, sports physician Michael Behringer first triggers them artificially to raise the cramp threshold frequency for these painful contractions.



How do foxes behave in the wild? East Berlin ethologist Günter Tembrock (1918–2011) observed the animals in his study's four walls and produced valid results with the help of film.

HUMANS IN MOTION

- **35 Kids' stuff?** ADHD can affect adults too By Jan Schwenkenbecher
- What can sport achieve?
 Final score from a research project on immigrant integration
 By Jan Schwenkenbecher

40 Dampening cramp

Sports physician shows that targeted training with electrical impulses raises cramp threshold frequency By Anne Hardy

MOTION WITH MEANING

- **45** Speaking with our hands How gestures and facial expressions can underline, supplement and modify the meaning of words By Anke Sauter
- 48 The fox who came in from the cold

How biologist Günter Tembrock used film for his behavioural research By Sophia Gräfe

54 Mobile production,

mobile consumption How the mobility of devices has changed film production By Laura Laabs

- 58 News
- 64 Legal notice Illustration credits
- 65 Preview