

# CONTENT



7

## ROAMING GAZELLES

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.



25

## 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.



28

## 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

- 7 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 Störko

## 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



## REFUGEE FOOTBALL TEAM

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.



## FILM AND BEHAVIOUR

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

### 38 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