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## RESEARCH

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##### Surf's up at SLAC

Efficient electron acceleration in a 30-centimetre-long plasma chamber  
Mike Downer & Rafal Zgadzaj

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#### 41 DEVELOPMENTAL BIOLOGY

##### Cells unite by trapping a signal

Cell coordination by trapped extracellular fibroblastic growth factors  
James Sharpe SEE LETTER P.120

#### 42 ASTROPHYSICS

##### Monster star found hiding in plain sight

Identification of a massive star in a young star cluster  
Donald F Figer

#### 44 ECOLOGY

##### Diversity breeds complementarity

Ecosystem-level consequences of character displacement in plants  
David Tilman & Emilie Snell-Rood

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#### 45 ORGANIC CHEMISTRY

##### Shape control in reactions with light

Stereoselective, photocatalytic  $\alpha$ -alkylation of carbonyl compounds  
Kazimer L Skubi & Tehshik P Yoon

SEE LETTER P.100

#### 46 CANCER

##### Metastasis risk after anti-macrophage therapy

Monocyte rebound to tumours after cessation of anti-CCL2 treatment  
Ioanna Keklikoglou & Michele De Palma  
SEE LETTER P.130

### ARTICLES

#### 75 EVOLUTIONARY BIOLOGY Life cycles, fitness decoupling and the evolution of multicellularity

K Hammerschmidt, C J Rose, B Kerr & P B Rainey

#### 80 STRUCTURAL BIOLOGY Architecture of mammalian respiratory complex I

K R Vinothkumar, J Zhu & J Hirst

### LETTERS

#### 85 ASTROPHYSICS Turbulent heating in



ON THE COVER

## Fast show

Simulation of a plasma wakefield accelerator: a two-bunch electron beam travels left-to-right through plasma. A team from the Facility for Advanced Accelerator Experimental Tests at SLAC reports acceleration of an electron bunch with unprecedented efficiency using this technology — a milestone in compact particle accelerator development. **PAGES 40 & 92**

galaxy clusters brightest in X-rays  
I Zhuravleva et al.

#### 88 ASTROPHYSICS Suppression of cooling by strong magnetic fields in white dwarf stars

G Vayns et al.

#### 92 ACCELERATOR PHYSICS High-efficiency acceleration of an electron beam in a plasma wakefield accelerator

M Litos et al. SEE N&V P.40

#### 96 OPTONICS AND PHOTONICS Solution-processed, high-performance light-emitting diodes based on quantum dots

X Dai et al.

#### 100 ORGANIC CHEMISTRY Asymmetric photoredox transition-metal catalysis activated by visible light

H Huo et al. SEE N&V P.45

#### 104 CLIMATE SCIENCE Recent Northern Hemisphere stratospheric HCl increase due to atmospheric circulation changes

E Mahieu et al.

#### 108 ECOLOGY Selection for niche differentiation in plant communities increases biodiversity effects

D Zupping-Dingley et al. SEE N&V P.44

#### 112 DEVELOPMENTAL BIOLOGY Nodal signalling determines biradial

asymmetry in *Hydra*  
H Watanabe et al.

#### 116 NEUROSCIENCE Sensory-evoked LTP driven by dendritic plateau potentials in vivo

F Gambino et al.

#### 120 DEVELOPMENTAL BIOLOGY Luminal signalling links cell communication to tissue architecture during organogenesis

S Durdu et al. SEE N&V P.41

#### 125 PLANT SCIENCE PLETHORA gradient formation mechanism separates auxin responses

A P Mähönen et al.

#### 130 CANCER Cessation of CCL2 inhibition accelerates breast cancer metastasis by promoting angiogenesis

L Bonapace et al. SEE N&V P.46

#### 134 CANCER Tumour-infiltrating Gr-1<sup>+</sup> myeloid cells antagonize senescence in cancer

D Di Mitri et al.

#### 138 IMMUNOLOGY Broad and potent HIV-1 neutralization by a human antibody that binds the gp41-gp120 interface

J Huang et al.

#### 143 CELL BIOLOGY Pseudouridine profiling reveals regulated mRNA pseudouridylation in yeast and human cells

T M Carille et al.

#### 147 STRUCTURAL BIOLOGY Crystal structure of the RNA-guided immune surveillance Cascade complex in *Escherichia coli*

H Zhao et al.



DEVELOPMENTAL BIOLOGY

## Body image

Vertebrate-like control of the body plan in lowly *Hydra*. **PAGE 112**