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Illustration of the black hole in Cygnus X-1, a binary star system 6000 light-years away. A disk of stellar material feeds this black hole, which is 15 times as massive as the Sun but less than 60 kilometers across. As it falls toward the black hole, some of the material gets expelled in two opposite jets. A section highlighting recent research on black holes begins on page 535. For the story behind the cover, go to http://scim.ag/cov6094.

Image: NASA/Chandra X-ray Center/M. Weiss
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Transformation Optics and Subwavelength Control of Light
J. B. Pendry et al.

BREVIA

Cartwheel Architecture of Trichonympha Basal Body
P. Guichard et al.
Electron microscopy provides a close-up view of the ninefold symmetric stacked rings at the base of cilia and flagella.

REPORTS

Radio Detections During Two State Transitions of the Intermediate-Mass Black Hole HLX-1
N. Webb et al.
Observations of a candidate intermediate-mass black hole support the scale invariance of jets in black holes.

Kepler-36: A Pair of Planets with Neighboring Orbits and Dissimilar Densities
J. A. Carter et al.
The Kepler spacecraft detected a super-Earth and a Neptune-like planet in very tightly spaced orbits around the same star.

Non-Centrosymmetric Cylindrical Micelles by Unidirectional Growth
P. A. Rupar et al.
A capping approach is used to create asymmetrical block copolymer micelles through self-assembly.

A Reversible and Higher-Rate Li-O2 Battery
Z. Peng et al.
A viable lithium-oxygen battery is demonstrated using dimethyl sulfoxide electrolyte and a porous gold cathode.

Aerosols from Overseas Rival Domestic Emissions over North America
H. Yu et al.
Roughly half of all particulate matter found in the air above North America originates from sources overseas.

Aerial Photographs Reveal Late-20th-Century Dynamic Ice Loss in Northwestern Greenland
K. H. Kjær et al.
Archived photographs extending back to the mid-1980s help show the role of dynamic thinning in ice mass loss from Greenland.

How Low Can You Go? Physical Production Mechanism of Elephant Infrasonic Vocalizations
C. T. Herbst et al.
Elephants produce low-frequency sounds via intrinsic vocal-fold vibrations similar to those in humans.

Feedback Regulation of Transcriptional Termination by the Mammalian Circadian Clock PERIOD Complex
K. Padmanabhan et al.
A circadian rhythm regulator acts by altering the elongation stage of gene expression.

Function, Targets, and Evolution of Caenorhabditis elegans piRNAs
M. P. Bagijn et al.
Piwi-bound piRNAs recruit endogenous small interfering RNAs to silence mobile genetic elements.

Cuckoos Combat Socially Transmitted Defenses of Reed Warbler Hosts with a Plumage Polymorphism
R. Thorogood and N. B. Davies
Parasitic cuckoos sporting new colors flourish after their warbler hosts learn to defend against the mainstream fashion.

Unraveling the Life History of Successful Invaders
D. Sol et al.
Allocating resources to long-lived adults is one means by which birds succeed in new niches.

Quantitative Modulation of Polycomb Silencing Underlies Natural Variation in Vernalization
V. Coustham et al.
Arabidopsis adjusts the onset of flowering to the length of winters via an epigenetic mechanism.

Mitochondrial Import Efficiency of ATFS-1 Regulates Mitochondrial UPR Activation
A. M. Nargund et al.
When stressed, the mitochondrion reduces import of a transcription factor, which enters the nucleus instead.

How Low Can You Go? Physical Production Mechanism of Elephant Infrasonic Vocalizations
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Elephants produce low-frequency sounds via intrinsic vocal-fold vibrations similar to those in humans.

Feedback Regulation of Transcriptional Termination by the Mammalian Circadian Clock PERIOD Complex
K. Padmanabhan et al.
A circadian rhythm regulator acts by altering the elongation stage of gene expression.
Flushing Out Drug Users

Two synaptic adhesion molecules that have been implicated in psychiatric diseases affect the kinetics of synaptic events.

Synaptic Inhibition in Mycobacterial Disease and Impaired IFN-γ Immunity in Humans with Inherited ISG15 Deficiency

A mutation that accounts for adverse reactions to the Bacille Calmette-Guérin vaccine against tuberculosis is identified.

Circadian Rhythm of Redox State Regulates Excitability in Suprachiasmatic Nucleus Neurons

Diurnal metabolic changes in circadian clock neurons are coupled to changes in potassium channel activity.

Mycobacterial Disease and Impaired IFN-γ Immunity in Humans with Inherited ISG15 Deficiency

D. Bogunovic et al.

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Editor's Summary

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