Three-dimensional computer models such as this one help researchers explore the mechanisms behind core-collapse supernovae, the violent death of short-lived massive stars. In the image, tubes represent paths of gas falling into a supernova, deflected by an accretion shockwave (horizontal width of 600 km); colors represent different velocities. The question of how stars explode is one of the "Mysteries of Astronomy" described in a special News package beginning on page 1090.

Visualization: Hongfeng Yu and Kwan-Liu Ma, University of California-Davis and the SciDAC Institute for Ultra-Scale Visualization; Simulation: John Blondin, North Carolina State University
**BREVIA**

1129 Structure of a 16-nm Cage Designed by Using Protein Oligomers  
Y.-T. Lai et al.  
A general computational method allows the design of proteins that self-assemble into a desired symmetric architecture.

**RESEARCH ARTICLE**

1130 Quantum Algorithms for Quantum Field Theories  
S. P. Jordan et al.  
A quantum computer may be able to efficiently simulate theories used to describe particle scattering in accelerators.  
>> Perspective p. 1114; Science Podcast

**REPORTS**

1133 The Detection and Characterization of a Nontransiting Planet by Transit Timing Variations  
D. Nesvorný et al.  
Analysis of the deviations in the orbit of a transiting exoplanet revealed an outer planet in the same planetary system.  
>> Perspective p. 1121

1137 Tracking Cooper Pairs in a Cuprate Superconductor by Ultrafast Angle-Resolved Photoemission  
C. L. Smallwood et al.  
Time-resolved spectroscopy is used to probe the dynamics of electron pairing recovery in a high-temperature superconductor.

1140 Graphene Barristor, a Triode Device with a Gate-Controlled Schottky Barrier  
H. Yang et al.  
The absence of defects and surface oxides at a graphene-silicon interface enables voltage control of graphene devices.

1143 Tailoring Electrical Transport Across Grain Boundaries in Polycrystalline Graphene  
A. W. Tsen et al.  
Overlap between crystallites in vapor-grown graphene improves its electronic conductivity.

1147 Theory Untangles the High-Resolution Infrared Spectrum of the \textit{ortho-H}_2-CO van der Waals Complex  
P. Jankowski et al.  
High-level calculations assign the unusually complex spectrum of a molecular pair implicated in interstellar chemistry.

1150 Secreted Kinase Phosphorylates Extracellular Proteins That Regulate Bion miner alization  
V. S. Tagliabracci et al.  
The elusive enzyme that modifies proteins involved in building bone and teeth has now been identified.

1154 Evolution of a Vertebrate Social Decision-Making Network  
L. A. O’Connell and H. A. Hofmann  
Across vertebrates, behaviorally relevant brain regions are remarkably conserved over 450 million years of evolution.

1157 Evolutionary Trade-Offs, Pareto Optimality, and the Geometry of Phenotype Space  
O. Shoval et al.  
The fitness of an organism can be modeled graphically to determine how phenotypic trade-offs are maximized.

1160 Chitin-Induced Dimerization Activates a Plant Immune Receptor  
T. Liu et al.  
Structural analysis shows how fungus-derived chitin dimerizes its receptor on target plants and triggers defense responses.

1164 Rocket Launcher Mechanism of Collaborative Actin Assembly Defined by Single-Molecule Imaging  
D. Breitsprecher et al.  
Triple-color microscopy suggests two factors interact to initiate actin formation and then separate as the filament grows.

1168 The Amyloid Precursor Protein Has a Flexible Transmembrane Domain and Binds Cholesterol  
P. J. Barrett et al.  
The structure of the APP transmembrane domain allows processive cleavage and cholesterol binding that may enhance cleavage.

1171 Computational Design of Self-Assembling Protein Nanomaterials with Atomic Level Accuracy  
N. P. King et al.  
A general computational method is used to design protein building blocks that self-assemble into target architectures.

1175 Generic Indicators for Loss of Resilience Before a Tipping Point Leading to Population Collapse  
L. Dai et al.  
Experiments in yeast confirm that statistical indicators can signal the approach of population crashes.

1178 B Cell Receptor Signal Transduction in the GC Is Short-Circuited by High Phosphatase Activity  
A. M. Khalil et al.  
Restricted B cell signaling in the areas responsible for immune memory cell production promotes affinity maturation.

1182 Restoring Voluntary Control of Locomotion after Paralyzing Spinal Cord Injury  
R. van den Brand et al.  
A rehabilitation program involving robotic neuroprosthetics restores previously paralyzed hindlimb function.
Continued growth in Asian pollution could warm the smell center of the human brain of new cells. Lack of stimulation may have robbed the brain of the capacity to form new connections and recover.

Highlights From Our Daily News Coverage

A Lipid Linchpin for Wnt-Fz Docking
M. Bienz and X. He

Crystal Structure of the Heterodimeric CLOCK:BMAL1 Transcriptional Activator Complex
N. Huang et al.
Structure-function analyses reveal details of the interaction between two proteins that regulate daily rhythms in mammals.

Membrane Fusion Intermediates via Directional and Full Assembly of the SNARE Complex
J. M. Hernandez et al.
During vesicle membrane fusion, straining of lipids at the edges of an extended contact zone may initiate fusion.

A Papaver somniferum 10-Gene Cluster for Synthesis of the Anticancer Alkaloid Noscapine
T. Winzer et al.
A biosynthetic pathway inherited as a gene cluster generates a pharmaceutically useful alkaloid in poppies.

RESEARCH ARTICLE: Sequence-Specific Recognition of a PxLpxL Motif by an Ankyrin Repeat Tumbler Lock
C. Xu et al.
Phosphorylation of a motif that binds to ankyrin repeat domains switches its binding preference to 14-3-3 proteins.

REVIEW: Signal Activation and Inactivation by the Go Helical Domain—A Long-Neglected Partner in G Protein Signaling
H. G. Dohlman and J. C. Jones
Structure studies suggest that the helical domain of G protein α subunits is an active participant in G protein signaling.

ST NETWATCH: UCSF Chimera, PyMOL
Render structures of biomolecules in various formats, generate animations, and model binding events.

RESEARCH ARTICLE: A Peptide Derived from Endostatin Ameliorates Organ Fibrosis
Y. Yamaguchi et al.
A naturally occurring peptide from endostatin can inhibit fibrosis in lung and skin, even when it is already established.

Career Q&A: Often Wrong, Never in Doubt
B. L. Benderly
A new book looks at science careers across the stages of women’s lives.

Science While Female
M. Fessenden
As head of the accelerator division at TRIUMF, Lia Merminga is a rare woman in the upper echelons of physics.

Endostatin Ameliorates Organ Fibrosis
S. P. Atamas
Endostatin ameliorates organ fibrosis, and promoters of the patient with BRAF kinase-impaired lung cancer confer sensitivity to Dasatinib.

Kinase-Impaired BRAF Mutations in Lung Cancer Confer Sensitivity to Dasatinib
B. Sen et al.
Induction of tumor cell senescence may explain the response of a patient with BRAF kinase-impaired lung cancer to the multitkine inhibitor dasatinib.

A Lipid Linchpin for Wnt-Fz Docking
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A powerful x-ray laser source can probe proteins by Serial Femtosecond Crystallography.

High-Resolution Protein Structure Determination by Serial Femtosecond Crystallography
S. Boutet et al.
A powerful x-ray laser source can probe proteins in detail using much smaller crystals than previously required.

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