



天文学文献摘要简报

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总十一期

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本期目录

星系与宇宙学..... 3

 New method to measure neutron star size uses modeling based on thermonuclear explosions..... 3

 MIT physicists design \$100 handheld muon detector 4

 Astronomers reveal nearby stars that are among the oldest in our galaxy 4

 Hunt for dark matter is narrowed by new University of Sussex research..... 5

 Duo of titanic galaxies captured in extreme starbursting merger 5

 Plasma from lasers can shed light on cosmic rays, solar eruptions 5

恒星与银河系..... 6

 Closest temperate world orbiting quiet star discovered..... 6

 Contracting white dwarf observed for the first time 6

太阳物理..... 7

 NASA detects solar flare pulses at sun and Earth 7

 Solar minimum surprisingly constant..... 7

太阳系和系外行星系统..... 8

 Moon's crust underwent resurfacing after forming from magma ocean..... 8

 Ice shapes the landslide landscape on Mars..... 8

 New physical model explains the origin of Earth's water 8

 Salt pond in Antarctica, among the saltiest waters on Earth, is fed from beneath 9

 FIREBIRD II and NASA mission locate whistling space electrons' origins..... 9

天文技术方法和仪器..... 10

 Interstellar space probes: Where's the brakes?! 10

 What is the computational power of the universe?..... 10

文章推荐..... 11

Nature..... 11

 Lightning, with a chance of antimatter 11

 IceCube experiment finds Earth can block high-energy particles from nuclear reactions..... 11

 How the Earth stops high-energy neutrinos in their tracks..... 12

 Previous evidence of water on Mars now identified as grainflows 12

 First known interstellar visitor is an 'oddball' 12



Taking a spin on plasma space tornadoes with NASA observations..... 13

A popular tool to trace Earth's oxygen history can give false positives 13

 Off track: How storms will veer in a warmer world 14

Pluto's hydrocarbon haze keeps dwarf planet colder than expected 14

Hitomi mission glimpses cosmic 'recipe' for the nearby universe 14

Gravitational waves from merging supermassive black holes will be spotted within 10 years..... 15

Science..... 15

 By saving cost and energy, the lighting revolution may increase light pollution..... 15

 Heavy nitrogen molecules reveal planetary-scale tug-of-war..... 16

 Nearby pulsars shed light on the antimatter puzzle 16

 Winds blowing off a dying star..... 16

说明..... 17

星系与宇宙学

[New method to measure neutron star size uses modeling based on thermonuclear explosions](#)

ABSTRACT: Neutron stars are made out of cold ultra-dense matter. How this matter behaves is one of the biggest mysteries in modern nuclear physics. Researchers developed a new method for measuring the radius of neutron stars which helps them to understand what happens to the matter inside the star under extreme pressure.



TITLE: Neutron star mass and radius measurements from atmospheric model fits to X-ray burst cooling tail spectra

AUTHOR: J. Nättilä, M.C. Miller, A.W. Steiner, J.J.E. Kajava, V.F. Suleimanov, J. Poutanen

PUBLISHED: A&A, Forthcoming article, Received: 02 May 2017 / Accepted: 26 September 2017

DOI: <https://doi.org/10.1051/0004-6361/201731082>

[MIT physicists design \\$100 handheld muon detector](#)

ABSTRACT: Physicists at MIT have designed a pocket-sized cosmic ray muon detector to track these ghostly particles. The detector can be made with common electrical parts, and when turned on, it lights up and counts each time a muon passes through. The relatively simple device costs just \$100 to build, making it the most affordable muon detector available today.

TITLE: The desktop muon detector: A simple, physics-motivated machine- and electronics-shop project for university students

AUTHOR: S. N. Axania, J. M. Conrad, and C. Kirby

PUBLISHED: American Journal of Physics 85, 948 (2017); Published Online: November 2017, Accepted: September 2017

DOI: <http://aapt.scitation.org/doi/10.1119/1.5003806>

[Astronomers reveal nearby stars that are among the oldest in our galaxy](#)

ABSTRACT: Astronomers have discovered some of the oldest stars in our Milky Way galaxy by determining their locations and velocities, according to a study led by scientists at Georgia State University.

TITLE: The Solar Neighborhood. XLII. Parallax Results from the CTIOPI 0.9 m Program—Identifying New Nearby Subdwarfs Using Tangential Velocities and Locations on the H–R Diagram

AUTHOR: Wei-Chun Jao (饒惟君), Todd J. Henry, Jennifer G. Winters, John P. Subasavage

PUBLISHED: The Astronomical Journal, Volume 154, Number 5

DOI: <http://iopscience.iop.org/article/10.3847/1538-3881/aa8b64?fromSearchPage=true>



Hunt for dark matter is narrowed by new University of Sussex research

ABSTRACT: Results disprove existence of a type of light axion.

TITLE: Search for Axionlike Dark Matter through Nuclear Spin Precession in Electric and Magnetic Fields

AUTHOR: C. Abel et al.

PUBLISHED: Phys. Rev. X 7, 041034 – Published 14 November 2017

Duo of titanic galaxies captured in extreme starbursting merger

ABSTRACT: ALMA has uncovered the never-before-seen close encounter between two astoundingly bright and spectacularly massive galaxies in the early universe.

TITLE: Rise of the Titans: A Dusty, Hyper-luminous "870 μm Riser" Galaxy at $z \sim 6$

AUTHOR: Dominik A. Riechers¹, T. K. Daisy Leung¹, Rob J. Ivison, Ismael Pérez-Fournon

PUBLISHED: The Astrophysical Journal, Volume 850, Number 1, published 2017 November 13 • © 2017

DOI: <http://iopscience.iop.org/article/10.3847/1538-4357/aa8ccf>

Plasma from lasers can shed light on cosmic rays, solar eruptions

ABSTRACT: A team of researchers led by PPPL physicist Will Fox recently used lasers to create conditions that mimic astrophysical behavior. The laboratory technique enables the study of outer-space-like plasma in a controlled and reproducible environment.

TITLE: Astrophysical particle acceleration mechanisms in colliding magnetized laser-produced plasmas

AUTHOR: W. Fox, J. Park, et al.

PUBLISHED: Physics of Plasmas, Volume 24, Issue 9, 10.1063/1.4993204

DOI: <http://aip.scitation.org/doi/10.1063/1.4993204>



恒星与银河系

Closest temperate world orbiting quiet star discovered

ABSTRACT: A temperate Earth-sized planet has been discovered only 11 light-years from the solar system by a team using ESO's unique planet-hunting HARPS instrument. The new world has the designation Ross 128 b and is now the second-closest temperate planet to be detected after Proxima b. It is also the closest planet to be discovered orbiting an inactive red dwarf star, which may increase the likelihood that this planet could potentially sustain life.

TITLE: A temperate exo-Earth around a quiet M dwarf at 3.4 parsecs

AUTHOR: X. Bonfils¹, N. Astudillo-Defru², et al

PUBLISHED: Astronomy & Astrophysics manuscript no. Ross128'final'v3

Contracting white dwarf observed for the first time

ABSTRACT: Astrophysicists from MSU (Russia) and his colleagues from Italy and Russian Academy of Sciences have found the first observational evidence for a contracting white dwarf. Constant high spin-up rate of a star of this type, located in an enigmatic binary system, can be easily explained if the white dwarf is contracting, the researchers argue. The discovery is reported in the Monthly Notices of the Royal Astronomical Society.

TITLE: A young contracting white dwarf in the peculiar binary HD 49798/RX J0648.0-4418 ?

AUTHOR: S. B. Popov, et al

PUBLISHED: Monthly Notices of the Royal Astronomical Society, stx2910

DOI: <https://academic.oup.com/mnras/advance-article/doi/10.1093/mnras/stx2910/4622972>



太阳物理

[NASA detects solar flare pulses at sun and Earth](#)

ABSTRACT: Two recent studies show how solar flares exhibit pulses or oscillations in the amount of energy being sent out. Such research provides new insights on the origins of these massive solar flares and the space weather they produce. This is key information as humans and robotic missions venture out into the solar system, farther and farther from Earth.

TITLE: Detection of Three-minute Oscillations in Full-disk Ly α Emission during a Solar Flare

AUTHOR: Ryan O. Milligan, Bernhard Fleck, Jack Ireland, Lyndsay Fletcher, and Brian R. Dennis

PUBLISHED: The Astrophysical Journal Letters, Volume 848, Number 1

DOI: <http://iopscience.iop.org/article/10.3847/2041-8213/aa8f3a/meta>

[Solar minimum surprisingly constant](#)

ABSTRACT: Using more than half a century of observations, Japanese astronomers have discovered that the microwaves coming from the Sun at the minimums of the past five solar cycles have been the same each time, despite large differences in the maximums of the cycles. This is an important step in understanding the creation and amplification of solar magnetic fields, which generate sunspots and other solar activity.

TITLE: Variation of the Solar Microwave Spectrum in the Last Half Century

AUTHOR: Masumi Shimojo, Kazumasa Iwai, Ayumi Asai, Satoshi Nozawa, Tetsuhiro Minamidani

PUBLISHED: The Astrophysical Journal, Volume 848, Number 1

DOI: <http://iopscience.iop.org/article/10.3847/1538-4357/aa8c75/meta>



太阳系和系外行星系统

[Moon's crust underwent resurfacing after forming from magma ocean](#)

ABSTRACT: A research team led by The University of Texas at Austin Jackson School of Geosciences took to the lab to recreate the magmatic melt that once formed the lunar surface and uncovered new insights on how the modern moonscape came to be.

TITLE: A Low Viscosity Lunar Magma Ocean Forms a Stratified Anorthitic Flotation Crust With Mafic Poor and Rich Units

AUTHOR: Nick Dygert, Jung-Fu Lin, Edward W. Marshall, Yoshio Kono, James E. Gardner

PUBLISHED: Geophysical Research Letters, first published: 21 November 2017

DOI: [10.1002/2017GL075703](https://doi.org/10.1002/2017GL075703)

[Ice shapes the landslide landscape on Mars](#)

ABSTRACT: How good is your Martian geography? In a new research paper published in EPJ Plus, Fabio De Blasio and colleagues from Milano-Bicocca University, Italy, explain the extent to which ice may have been an important medium of lubrication for landslides on Mars.

TITLE: Modelling Martian landslides: dynamics, velocity, and paleoenvironmental implications

AUTHOR: Fabio Vittorio De Blasio, Giovanni Battista Crosta

PUBLISHED: The European Physical Journal Plus, 132:468

DOI: [10.1140/epjp/i2017-11727-x](https://doi.org/10.1140/epjp/i2017-11727-x)

[New physical model explains the origin of Earth's water](#)

ABSTRACT: Objects scattered to the inner region of the Solar System by Jupiter's growth brought most of the water now found on Earth. Authors of an journal Icarus article describe a computational model which simulates the gravitational interaction between celestial bodies during the era of planet formation, also providing basis for the hypothesis of the dragging of water-rich "planetesimals".



TITLE: Origin of water in the inner Solar System: Planetesimals scattered inward during Jupiter and Saturn's rapid gas accretion

AUTHOR: Sean N. Raymond, Andre Izidoro

PUBLISHED: Icarus, Volume 297, 15 November 2017, Pages 134-148

DOI: <http://www.sciencedirect.com/science/article/pii/S0019103517302592?via%3Dihub>

Salt pond in Antarctica, among the saltiest waters on Earth, is fed from beneath

ABSTRACT: One of the saltiest bodies on Earth, an analog for what water might look like on Mars, is just one piece of a larger aquifer.

TITLE: The geochemistry of Don Juan Pond: Evidence for a deep groundwater flow system in Wright Valley, Antarctica

AUTHOR: J.D. Toner, D.C. Catling, R.S. Sletten

PUBLISHED: Earth and Planetary Science Letters, Volume 474, 15 September 2017, Pages 190-197

DOI: <http://www.sciencedirect.com/science/article/pii/S0012821X17303552?via%3Dihub>

FIREBIRD II and NASA mission locate whistling space electrons' origins

ABSTRACT: New research using data from NASA's Van Allen Probes mission and FIREBIRD II CubeSat has shown that plasma waves in space are likely responsible for accelerating high-energy particles into Earth's atmosphere.

TITLE: Observations directly linking relativistic electron microbursts to whistler mode chorus: Van Allen Probes and FIREBIRD II

AUTHOR: A. W. Breneman, A. Crew, J. Sample, D. Klumpp, A. Johnson, O. Agapitov, M. et al

PUBLISHED: Geophysical Research Letters

DOI: [10.1002/2017GL075001](https://doi.org/10.1002/2017GL075001)



天文技术方法和仪器

[Interstellar space probes: Where's the brakes?!](#)

ABSTRACT: With a miniaturized space probe capable of being accelerated to a quarter of the speed of light, we could reach Alpha Centauri, our nearest star, in 20 to 50 years. However, without a mechanism to slow it down, the space probe could only collect data from the star and its planets as it zoomed past. A theoretical physicist at Goethe University Frankfurt has now examined whether interstellar spacecraft can be decelerated using 'magnetic sails.'

PUBLICATIONS:

Claudius Gros: Universal scaling relation for magnetic sails: momentum braking in the limit of dilute interstellar media, *Journal of Physics Communications* 1, 045007 (2017)

<http://iopscience.iop.org/article/10.1088/2399-6528/aa927e>

Claudius Gros: Developing Ecospheres on Transiently Habitable Planets: The Genesis Project, in: *Astrophysics and Space Science* 361, 324 (2016)

<http://link.springer.com/article/10.1007/s10509-016-2911-0>

[What is the computational power of the universe?](#)

ABSTRACT: Can a close look at the universe give us solutions to problems too difficult for a computer -- even if we built a computer larger than a planet? Physicist Stephen Jordan reflects on this question in a new NIST video, along with a scientific paper that considers one particular tough problem the universe might answer.

TITLE: Fast optimization algorithms and the cosmological constant

AUTHOR: Ning Bao, Raphael Bousso, Stephen Jordan, and Brad Lackey

PUBLISHED: Phys. Rev. D 96, 103512 – Published 13 November 2017



文章推荐

Nature

[Lightning, with a chance of antimatter](#)

ABSTRACT: Researchers find that lightning strikes causes photonuclear reactions in the atmosphere, creating antimatter.

TITLE: Photonuclear reactions triggered by lightning discharge

AUTHOR: Teruaki Enoto, et al.

PUBLISHED: Nature 551, 481 – 484 (23 November 2017)

DOI: [10.1038/nature24630](https://doi.org/10.1038/nature24630)

PUBLIC RELEASE: 22-Nov-2017

[IceCube experiment finds Earth can block high-energy particles from nuclear reactions](#)

ABSTRACT: For the first time, a science experiment has measured Earth's ability to absorb neutrinos -- the smaller-than-an-atom particles that zoom throughout space and through us by the trillions every second at nearly the speed of light. The experiment was achieved with the IceCube detector, an array of 5,160 basketball-sized sensors frozen deep within a cubic kilometer of very clear ice near the South Pole.

TITLE: Measurement of the multi-TeV neutrino interaction cross-section with IceCube using Earth absorption

AUTHOR: The IceCube Collaboration

PUBLISHED: Nature, Published online:22 November 2017

DOI: [10.1038/nature24459](https://doi.org/10.1038/nature24459)

PUBLIC RELEASE: 22-NOV-2017



How the Earth stops high-energy neutrinos in their tracks

ABSTRACT: In an analysis of data from an experiment embedded in Antarctic ice, a research collaboration including scientists from Berkeley Lab has demonstrated that the Earth stops high-energy neutrinos -- particles that only very rarely interact with matter.

TITLE: Measurement of the multi-TeV neutrino interaction cross-section with IceCube using Earth absorption

AUTHOR: The IceCube Collaboration

PUBLISHED: Nature, Published online:22 November 2017

DOI: [10.1038/nature24459](https://doi.org/10.1038/nature24459)

Previous evidence of water on Mars now identified as grainflows

ABSTRACT: Dark features previously proposed as evidence for significant liquid water flowing on Mars have now been identified as granular flows, where sand and dust move rather than liquid water, according to a new article published in Nature Geoscience by the USGS. These findings indicate that present-day Mars may not have a significant volume of liquid water. The water-restricted conditions that exist on Mars would make it difficult for Earth-like life to exist near the surface.

TITLE: Granular flows at recurring slope lineae on Mars indicate a limited role for liquid water

AUTHOR: Colin M. Dundas, Alfred S. McEwen, Matthew Chojnacki, Moses P. Milazzo, Shane Byrne, Jim N. McElwaine & Anna Urso

PUBLISHED: Nature Geoscience (2017), published online:20 November 2017

DOI: [10.1038/s41561-017-0012-5](https://doi.org/10.1038/s41561-017-0012-5)

First known interstellar visitor is an 'oddball'

ABSTRACT: Gemini Observatory provided key observations in characterizing an object visiting from outside our solar system, 'Oumuamua. After the object was discovered by Pan-STARRS1 on Haleakala, both Gemini telescopes dropped everything to observe 'Oumuamua for three nights as it quickly dimmed from



view. Researchers found that despite its interstellar origin, the object is similar in composition to some objects in our Solar System but its shape is unlike anything found around our Sun.

TITLE: A brief visit from a red and extremely elongated interstellar asteroid

AUTHOR: Karen J. Meech, Robert Weryk, et al.

PUBLISHED: Nature, published online:20 November 2017

DOI: [10.1038/nature25020](https://doi.org/10.1038/nature25020)

[Taking a spin on plasma space tornadoes with NASA observations](#)

ABSTRACT: New NASA mission results show that tornado-like swirls of space plasma create tumultuous boundaries in the near-Earth environment, letting dangerous high-energy particles slip into near Earth space.

TITLE: Turbulent mass transfer caused by vortex induced reconnection in collisionless magnetospheric plasmas

AUTHOR: T. K. M. Nakamura, H. Hasegawa, W. Daughton, S. Eriksson, W. Y. Li & R. Nakamura

PUBLISHED: Nature Communications 8, Article number: 1582 (2017), published online:17 November 2017

DOI: [10.1038/s41467-017-01579-0](https://doi.org/10.1038/s41467-017-01579-0)

[A popular tool to trace Earth's oxygen history can give false positives](#)

ABSTRACT: If someone cries 'Eureka!' because it looks like oxygen appeared in Earth's ancient atmosphere long before the body of evidence indicated, be careful. If it was a chromium isotope system reading that caused the enthusiasm, it might need to be curbed.

TITLE: Redox-independent chromium isotope fractionation induced by ligand-promoted dissolution

AUTHOR: Emily M. Saad, Xiangli Wang, Noah J. Planavsky, Christopher T. Reinhard & Yuanzhi Tang

PUBLISHED: Nature Communications 8, Article number: 1590 (2017), published online:17 November 2017

DOI: [10.1038/s41467-017-01694-y](https://doi.org/10.1038/s41467-017-01694-y)



Off track: How storms will veer in a warmer world

ABSTRACT: The dry, semi-arid regions are expanding into higher latitudes, and temperate, rainy regions are migrating poleward. In a paper that was recently published in Nature Geoscience, Weizmann Institute of Science researchers provide new insight into this phenomenon by discovering that mid-latitude storms are steered further toward the poles in a warmer climate.

TITLE: Enhanced poleward propagation of storms under climate change

AUTHOR: Talia Tamarin-Brodsky & Yohai Kaspi

PUBLISHED: Nature Geoscience (2017)

DOI: [10.1038/s41561-017-0001-8](https://doi.org/10.1038/s41561-017-0001-8)

Pluto's hydrocarbon haze keeps dwarf planet colder than expected

ABSTRACT: The gas composition of a planet's atmosphere generally determines how much heat gets trapped in the atmosphere. For the dwarf planet Pluto, however, the predicted temperature based on the composition of its atmosphere was much higher than actual measurements taken by NASA's New Horizons spacecraft in 2015. A new study published November 16 in Nature proposes a novel cooling mechanism controlled by haze particles to account for Pluto's frigid atmosphere.

TITLE: Haze heats Pluto's atmosphere yet explains its cold temperature

AUTHOR: Xi Zhang, Darrell F. Strobel & Hiroshi Imanaka

PUBLISHED: Nature 551, 352–355 (16 November 2017), published online: 15 November 2017

DOI: [10.1038/nature24465](https://doi.org/10.1038/nature24465)

Hitomi mission glimpses cosmic 'recipe' for the nearby universe

ABSTRACT: Thanks to an in-depth look into the composition of gas in the Perseus galaxy cluster, Japan's Hitomi mission has given scientists new insights into the stellar explosions that formed its chemical elements.



TITLE: Solar abundance ratios of the iron-peak elements in the Perseus cluster

AUTHOR: Hitomi Collaboration

PUBLISHED: Nature 551, 478–480 (23 November 2017)

DOI: [10.1038/nature24301](https://doi.org/10.1038/nature24301)

Gravitational waves from merging supermassive black holes will be spotted within 10 years

ABSTRACT: New research published November 13 in Nature Astronomy predicts that gravitational waves generated by the merger of two supermassive black holes -- the strongest gravitational waves in the universe -- will be detected within 10 years. The study is the first to use real data, rather than computer simulations, to predict when such an observation will be made.

TITLE: The local nanohertz gravitational-wave landscape from supermassive black hole binaries

AUTHOR: Chiara M. F. Mingarelli, et al

PUBLISHED: Nature Astronomy (2017)

DOI: [10.1038/s41550-017-0299-6](https://doi.org/10.1038/s41550-017-0299-6)

Science

By saving cost and energy, the lighting revolution may increase light pollution

ABSTRACT: Municipalities, enterprises, and households are switching to LED lights in order to save energy. But these savings might be lost if their neighbors install new or brighter lamps. Scientists fear that this 'rebound effect' might partially or totally cancel out the savings of individual lighting retrofit projects, and make skies over cities considerably brighter.

TITLE: Artificially lit surface of Earth at night increasing in radiance and extent

AUTHOR: Christopher C. M. Kyba, Theres Kuester, et al.

PUBLISHED: *Science Advances* 22 Nov 2017:Vol. 3, no. 11, e1701528

DOI: [10.1126/sciadv.1701528](https://doi.org/10.1126/sciadv.1701528)



Heavy nitrogen molecules reveal planetary-scale tug-of-war

ABSTRACT: Researchers from Rice University, UCLA, Michigan State and the University of New Mexico have discovered a planetary-scale tug-of-war between life, deep Earth and the upper atmosphere that is expressed in atmospheric nitrogen. The research appears this week in *Science Advances*.

TITLE: Extreme enrichment in atmospheric $^{15}\text{N}^{15}\text{N}$

AUTHOR: Laurence Y. Yeung, Shuning Li, Issaku E. Kohl, et al.

PUBLISHED: *Science Advances* 17 Nov 2017:Vol. 3, no. 11, eaao6741

DOI: [10.1126/sciadv.aao6741](https://doi.org/10.1126/sciadv.aao6741)

[Nearby pulsars shed light on the antimatter puzzle](#)

ABSTRACT: There are too many high-energy positrons in the cosmic rays reaching the Earth. These positrons (particles that are antimatter equivalents of electrons) could be being produced by pulsars in our vicinity. The most recent measurements from the HAWC Observatory in Mexico have practically excluded this possibility, strengthening the competing and much more exotic hypothesis concerning the origin of the excess positrons.

TITLE: Extended gamma-ray sources around pulsars constrain the origin of the positron flux at Earth

AUTHOR: A. U. Abeysekara, A. Albert, R. Alfaro, et al.

PUBLISHED: *Science* 17 Nov 2017:Vol. 358, Issue 6365, pp. 911-914

DOI: [10.1126/science.aan4880](https://doi.org/10.1126/science.aan4880)

[Winds blowing off a dying star](#)

ABSTRACT: Using ALMA, Japanese scientists explain why aluminum oxide is so abundant around AGB stars.

TITLE: Dust formation and wind acceleration around the aluminum oxide-rich AGB star W Hydrae

AUTHOR: Aki Takigawa, et al.



PUBLISHED: Science Advances 01 Nov 2017:Vol. 3, no.11, eaao2149

DOI: [10.1126/sciadv.aao2149](https://doi.org/10.1126/sciadv.aao2149)

说明

根据天文学十三五规划，天文领域分类如下：

- ✦ 1.恒星与银河系：包含星系介质与恒星形成、恒星结构与演化、致密天体、银河系
- ✦ 2.星系宇宙学；暗物质、暗能量、黑洞
- ✦ 3.天文技术方法和仪器：包含光学红外天文技术、射电天文技术、空间天文技术
- ✦ 4.太阳系和系外行星系统；
- ✦ 5.太阳物理；
- ✦ 6.基本天文：包含天体测量、天体力学、时间频率、相对论基本天文学、基本天文学应用（深空探测与导航、天文地球动力学）