

## Subject Index

### A

- AAR (Adirondack Astronomy Retreat), 2:60
- AAS (American Astronomical Society), 5:17
- Abell 21 (Medusa Nebula; Sharpless 2-274; PK 205+14), 10:62
- Abell 33 (planetary nebula), 10:23
- Abell 61 (planetary nebula), 8:72
- Abell 81 (IC 1454) (planetary nebula), 12:54
- Abell 222 (galaxy cluster), 11:18
- Abell 223 (galaxy cluster), 11:18
- Abell 520 (galaxy cluster), 10:52
- ACT-CL J0102-4915 (El Gordo) (galaxy cluster), 10:33
- Adirondack Astronomy Retreat (AAR), 2:60
- AF (Astronomy Foundation), 1:14
- AKARI infrared observatory, 3:17
- The Albuquerque Astronomical Society (TAAS), 6:21
- Algol (Beta Persei) (variable star), 11:14
- ALMA (Atacama Large Millimeter/submillimeter Array), 2:13, 5:22
- Alpha Aquilae (Altair) (star), 8:58–59
- Alpha Centauri (star system), possibility of manned travel to, 7:22–27
- Alpha Cygni (Deneb) (star), 8:58–59
- Alpha Lyrae (Vega) (star), 8:58–59
- Alpha Virginis (Spica) (star), 12:71
- Altair (Alpha Aquilae) (star), 8:58–59
- amateur astronomy
  - clubs, 1:14
  - websites to create observing charts, 3:61–63
- American Astronomical Society (AAS), 5:17
- Andromeda Galaxy (M31)
  - aging Sun-like stars in, 5:22
  - black hole in, 6:17
  - close pass by Triangulum Galaxy, 10:15
  - collision with Milky Way, 5:47
  - dwarf galaxies orbiting, 3:20
- Antennae (NGC 4038 and NGC 4039) (colliding galaxies), 10:46
- antihydrogen, 7:18
- antimatter, energy produced when matter collides with, 3:51
- Apollo missions, images taken of landing sites, 1:19
- Aristarchus Crater (feature on Moon), 10:60–61
- Armstrong, Neil, 12:18
- arsenic, found in old star, 9:15
- asteroids
  - See also names of specific asteroids*
  - collision with Earth and extinction of dinosaurs, 1:24
  - detectability of collisions with Sun, 12:50
  - "iron-loving" elements, 8:16
  - Late Heavy Bombardment, 8:14
  - near-Earth flybys, 2:19, 3:22
  - observing near-earth, 2:48–49
  - sharing Earth's orbit, 1:29
- astrobiology, 3:17
- astroimaging

# Astronomy Magazine 2012 Index

---

- atmospheric coronae, 10:66
- capturing sky and landscape, 8:52–57
- cellphone digiscoping, 10:12
- combining images to reduce noise, 4:62
- content recognition feature of image editing software, 3:15
- with digital single-lens reflex cameras, 11:66
- equipment checklist, 6:15
- false-color images, 10:10
- fixing oval stars, 12:66
- guiding, 5:15
- High Dynamic Range processing, 7:13, 8:65
- light pollution, 1:74
- from Namibia, 6:53–59
- 100 greatest pictures of the year, 10:20–63
- Photoshop's Lab Color feature, 2:62
- Polaris Star Tracker, 8:62–63
- reducing overly bright and big stars, 10:68
- stereoscopic images, 1:58–59
- techniques for, 9:66
- astronauts
  - applicants for next class, 2:13, 6:17
  - 50 years of manned space exploration, 2:20–25
  - Neil Armstrong, 12:18
  - Sally Ride, 11:19
- astronomical sketching
  - See also subjects of sketches by name*
  - Eagle Nebula and NGC 7023, 8:66
  - how to observe and draw deep-sky objects, 1:64–68
  - M13 and NGC 5897, 5:62
  - M36 and M37, 1:80
  - M67 and NGC 2775, 4:64
  - NGC 772 and NGC 1156, 10:70
  - NGC 1232 and NGC 1300, 2:67
  - NGC 3242 and NGC 6729, 6:64
  - NGC 5248 and NGC 5466, 3:64
  - NGC 6751 and NGC 6772, 7:64
- astronomy
  - See also amateur astronomy*
  - anticipating big future events, 6:12
  - brevity and precision in articles regarding, 9:10
  - costs of, 2:10
  - exclusion of women from, 8:10
  - fake astro-products, 12:10
  - flawed statements, 4:12
  - historical tour of European countries, 2:53–55
  - illusions and illusory objects in, 3:12
  - important numbers in, 6:30–35
  - interview with associate professor of physics and astronomy, 2:16
  - observations from Chile, 2:50–52
  - observations in spring, 5:48–49, 58–59
  - observations in summer, 7:56–57
  - observations in winter, 2:11, 46–47
  - outstanding products, 9:56–63
  - participating in though disabled, 8:64
  - pronunciation, 7:12
  - search for most distant objects, 9:20–25

# Astronomy Magazine 2012 Index

---

- top nine targets to observe, 12:12
- top ten stories of 2012, 1:26–33
- websites for creating observation charts, 3:61–63
- Astronomy Day, 4:13
- Astronomy Foundation (AF), 1:14
- Astronomy* magazine
  - 100 greatest pictures of the year, 10:20–63
  - Out-of-this-world Award, 1:24, 6:21
  - 10 years of Observing Basics column, 11:12
- astrophysics
  - astrophysicist Brian May, 9:26–35
  - interview with astrophysicist, 5:20
- AstroTrac TT320X-AG tracking mount, 2:56–57
- Atacama Large Millimeter/submillimeter Array (ALMA), 2:13, 5:22
- Atacama Pathfinder Experiment radio telescope, 10:31
- atmospheric coronae, 10:66
- atoms, 1:36
- aurorae
  - daylight, 8:11
  - images of, 10:35, 57
  - on Uranus, 8:15

## B

- B612 Foundation, 10:16
- Baby Nebula (IC 1848), 2:70, 10:59
- Baily's beads, 7:11
- Baker Street Irregular Astronomers, 5:54–57
- Barnard 30 (dark nebula), 11:74
- Barnard 33 (Horsehead Nebula), 5:8–9
- Barnard 150 (dark nebula), 10:52
- BD+01 2920B (brown dwarf), 9:15
- Beehive Cluster (M44), 5:67–71
- Berkeley 39 (open cluster), 6:70
- Beta Persei (Algol) (variable star), 11:14
- Beta Tauri (Elnath) (star), 10:24
- binary star systems
  - containing black holes, 5:16
  - containing neutron stars, 5:16, 7:20
  - observing, 5:13
  - O-type stars, 11:17
  - planets orbiting, 5:16, 12:17
  - rapidly orbiting, 11:18
  - ultramassive stars formed from, 12:17
- black holes
  - in Andromeda Galaxy, 6:17
  - changes in understanding of growth of, 11:22
  - closest supermassive, 1:18
  - companion to Cygnus X-1, 4:17
  - development of supermassive, 1:19
  - evidence of existence at center of galaxies, 10:64–65
  - gas cloud headed toward supermassive, 4:16
  - hindering star formation, 9:15
  - intermediate-mass, 6:20, 11:17
  - in Milky Way, 9:44–49
  - modification of environment by, 4:24–29

# Astronomy Magazine 2012 Index

---

- most massive known, 4:22
- observed swallowing star, 1:30–31
- propulsion of "bullets" of gas, 1:18
- "seeds" of supermassive, 11:17
- X-ray flares from, 6:18
- X-ray signal emitted from star falling into, 12:17

blue straggler stars, 2:13

Bok globules, 4:44–49, 10:58

Bonneville Crater (feature on Mars), 10:60

Boston Marathon, 3:13

Bow Shock layer of heliosphere, 9:19

Brahe, Tyco, 2:53–55

brown dwarfs

- determining physical properties of, 9:15
- formation of, 3:30–35
- future core of, 11:17
- if orbited Sun at Jupiter's location, 6:48–49

Bubble Nebula (NGC 7635), 7:58–61

buckyballs, 6:17

Bullet Cluster, 8:12

BX442 (spiral galaxy), 11:16

## C

*Caenorhabditis elegans*, 11:17

Caldwell 43 (NGC 7814) (spiral galaxy), 4:69

California Institute of Technology, 11:17

California Nebula (NGC 1499), 3:70–71

Camelopardalis (constellation), 10:62

Cancer (constellation), 5:67–71

carbon monoxide, in gas of supernova remnant, 6:16

Carina Nebula (NGC 3372), 6:21, 10:15, 56, 60

Carter, Josh, 5:20

Cassini spacecraft

- image of Titan and Dione, 4:16
- storm in atmosphere of Saturn, 3:19

Cassiopeia (constellation), 1:16–17

Cassiopeia A supernova remnant, 6:16

Castillo-Rogez, Julie, 10:18–19

Cat's Paw Nebula (NGC 6334), 10:32

CB 230 (Sharpless 2-136) (Bok globule), 10:58

Cederblad 214 (emission nebula), 3:68, 5:67–71

Celestron

- death of founder, 7:15
- SkyProdigy 6 telescope, 12:64–65

cellphone digiscoping, 10:12

Centaurus A (NGC 5128) (radio galaxy), 9:15, 10:57

Cepheid variable stars, changing mass of, 1:32

Cepheus the King (constellation), 9:52–53

CERN (European Organization for Nuclear Research)

- Higgs boson, 4:22, 10:14
- speed of neutrinos, 1:18

Chandra X-ray Observatory, 5:22

chemistry

- origins of, 1:36
- use of in research into universe, 1:34–39

# Astronomy Magazine 2012 Index

---

China, recent space program successes, 1:24  
Christian Latouche IMageur SOlaire (CLIMSO) telescope, 10:34  
Clouds of Perseus project, 3:70–71  
CMEs (coronal mass ejections), 4:22, 5:17  
Cn (copernicium), 3:17  
Coathanger (asterism), 11:73  
Cocoon Nebula (IC 5146), 1:81, 10:33, 12:55  
Comet 1P/Halley, return of, 9:51  
Comet 45P/Honda-Mrkos-Pajdušáková, 2:69  
Comet 81P/Wild, 7:15  
Comet 103P/Hartley, 2:17  
Comet C/2009 P1 (Garradd), 1:82, 4:70, 6:71, 8:13, 10:30  
Comet C/2010 X1 (Elenin), 2:16  
Comet C/2011 W3 (Lovejoy), 5:67–71, 10:58, 12:50  
Comet C/2012 S1 (ISON), 12:16  
comets  
    *See also names of specific comets*  
    detectability of collisions with Sun, 12:50  
    harpoon to collect samples from, 4:17  
    observed disintegrating near Sun, 5:19  
    as possible source of Earth's water, 2:17  
    roundness of, 10:65  
Cone Nebula (NGC 2264), 6:72, 10:30  
conjunctions  
    of 2012, 7:10  
    Jupiter-Venus, 11:72  
    Mercury-Moon-Uranus, 9:73  
constellations, origins of, 4:58–59. *See also names of specific constellations*  
copernicium (Cn), 3:17  
Coronado SolarMax II 60 Telescope, 5:60–61  
coronal mass ejections (CMEs), 4:22, 5:17  
cosmic background radiation, 6:49  
cosmic rays  
    changes to Moon's ice from, 7:15  
    gamma-ray bursts not responsible for, 8:12  
cosmology, winners of Nobel Prize in physics, 1:19  
Crab Nebula, changing X-ray emissions from, 1:32  
craters. *See also names of specific craters*  
    lunar, 1:21  
    microbial life beneath, 8:13  
    roundness of, 2:45  
Crescent Nebula (NGC 6888), 2:71  
Curiosity rover  
    descent to surface of Mars, 8:24–25  
    first days on Mars, 12:24–29  
    landing of, 12:22  
    overview of, 3:18  
    search for evidence of life on Mars, 8:20–25  
Cygnus (constellation)  
    nebulousity in, 2:71  
    stellar birth in region of, 5:21  
Cygnus X-1 (binary system), companion black hole, 4:17

## D

Dark Doodad (molecular cloud), 10:23

# Astronomy Magazine 2012 Index

---

- dark energy
    - type Ia supernovae and, 7:44–49
    - universe's expansion and, 7:15
  - dark matter
    - filling intergalactic space, 6:22
    - gravitational effects not attributable to planets, 8:51
    - inconsistent behavior of, 7:18
    - maps of, 5:18
    - near Sun, 8:15, 12:22
    - research into, 2:13
      - between two galaxy clusters, 11:18
  - Dark Sky Communities, 3:22
  - Dawn spacecraft
    - approaches Vesta, 4:18
    - leaves Vesta, 12:17
    - results from Vesta, 8:13
    - Rheasilvia crater, 9:18
  - Deer Lick Group (galaxy group), 10:34
  - Deneb (Alpha Cygni) (star), 8:58–59
  - Dione (moon of Saturn), 4:16, 10:59
  - Discovery Channel Telescope, 11:22
  - Double Cluster (NGC 869 and NGC 884), 9:72
  - double stars. *See* binary star systems
  - Dragon spacecraft, launch of, 9:16
  - Drake, Michael J., 1:19
  - dwarf galaxies
    - collisions between, 3:17
    - formation of, 6:16
    - in neighborhood of Milky Way, 1:24, 11:22
    - orbiting Andromeda Galaxy, 3:20
    - ultra-compact, 4:16
- ## E
- Eagle Nebula (M16), 8:66, 10:29
  - Earth
    - comets as possible source of water, 2:17
    - dating of mantle, 6:17
    - effect on if brown dwarf orbited at Jupiter's location, 6:48–49
    - ellipticity of orbit, 6:49
    - global warming, 3:19, 5:17
    - gravitational effect if Sun was removed, 7:50
    - Great Oxygenation Event, 11:44–49
    - image of, 10:61
    - Late Heavy Bombardment period, 8:14, 11:30–35
    - lightning-related signature, 9:15
    - Little Ice Age, 6:22
    - magnetic belts, 12:18
    - origin of water on, 7:28–35
    - precession of axis, 9:50
    - stretching of magnetic field, 6:17
    - Trojan companion asteroids, 1:29
    - wobble of axis, 4:50
  - eclipses
    - lunar, 4:68, 10:24, 46–47, 49, 11:57, 72
    - solar, 3:50, 52–57, 5:48–49, 7:11, 50, 9:71–72, 10:44–45, 51, 12:56–59

# Astronomy Magazine 2012 Index

---

- Ehlmann, Bethany, 3:20
- Einstein, Albert, 3:24–29
- Einstein rings, 10:53
- El Gordo (ACT-CL J0102-4915) (galaxy cluster), 10:33
- electromagnetism, 5:45
- Elenin (Comet C/2010 X1), 2:16
- Elephant Trunk Nebula, 10:60
- Ellis-Grayson-Bond 6 (planetary nebula), 4:69
- Elnath (Beta Tauri) (star), 10:24
- emission nebulae. *See names of specific emission nebulae*
- Enceladus (moon of Saturn), 2:18, 10:50
- Eris (dwarf planet), 2:15
- ESA (European Space Agency). *See names of specific spacecraft and missions*
- ESO. *See European Southern Observatory (ESO)*
- Eta Carinae (star), 10:56
- Euclid mission, 2:13
- Europa (moon of Jupiter), water on, 3:20
- European Extremely Large Telescope, 10:15
- European Organization for Nuclear Research. *See CERN (European Organization for Nuclear Research)*
- European Southern Observatory (ESO)
  - European Extremely Large Telescope, 10:15
  - Very Large Telescope, 10:46–47, 55
  - Visible and Infrared Survey Telescope for Astronomy, 5:21
- European Space Agency (ESA). *See names of specific spacecraft and missions*
- Evans, Rebekah, 12:21
- extrasolar planets (exoplanets)
  - determining mass of, 10:15
  - discovered by citizen scientists, 1:19
  - discovered orbiting red dwarf, 5:22
  - discovered using HARPS, 1:20
  - discovered using Kilo-degree Extremely Little Telescope, 10:15
  - discovery of Earth-sized, 4:19, 22
  - discovery of small, 11:17
  - discovery of using old data, 2:18
  - disintegrating, 9:17
  - Earth-like, 1:31, 3:16, 9:15
  - effects of x-ray flares on, 10:16
  - hot Jupiters, 9:15
  - hypervelocity, 7:15
  - orbiting binary star systems, 5:16, 12:17
  - orbiting closely, 10:15
  - orbiting in resonance, 2:13
  - orbiting metal-poor stars, 7:16
  - orbiting red-giant stars, 7:15
  - orbiting variety of stars, 10:15
  - orbits aligned with star's rotation, 11:21
  - in process of formation, 2:19
  - questions remaining to be answered, 5:20
  - rogue, 6:24–29
  - super-Earths, 4:17, 6:22
  - swallowed by red giant star, 4:18
  - with water, 6:16
- extraterrestrial life
  - search for, 3:17, 4:17
  - search for evidence of on Mars, 8:20–25
  - what happens if found, 5:24–29

# Astronomy Magazine 2012 Index

---

The Eyes (galaxy pair), 10:61

## F

Facebook, 4:56–57

false-color images, 10:10

Fan Lizhi, 8:13

Fermi Gamma-ray Space Telescope, 3:19, 4:17

Fermi National Accelerator Laboratory, 1:24

Flame Nebula (NGC 2024), 5:8–9, 11:17

Flaming Star Nebula (IC 405), 7:71

Flying Ghost Nebula (van den Bergh 19) (reflection nebula), 5:67–71

Fomalhaut (star), 8:16

Furlanetto, Steve, 2:16

## G

galaxies

*See also names of specific galaxies; names of specific types of galaxies*

collisions between, 2:13

containing carbon, 2:18

discovery of distant, 4:20

faster evolution than expected, 9:15

formed soon after the Big Bang, 8:51

infrared, 12:20

intense star birth without collisions, 1:24

observing in spring, 5:48–49

rectangular, 7:14

recycling gas for star formation, 7:17

recycling of star-forming material, 8:18

seeing through dust surrounding, 9:16

star clusters versus, 6:48

star formation in early, 8:14

star-forming halos, 3:22

galaxy clusters

*See also names of specific galaxy clusters*

arc of blue light behind, 10:18

largest known, 5:22

mergers of, 8:12

most distant, 7:15

Galaxy Evolution Explorer (GALEX), 9:15

Gamma Cygni (Sadr) (star), 2:71

gamma-ray bursts (GRBs), not responsible for cosmic rays, 8:12

gamma-ray pulsars, 3:19, 11:22

Garradd (Comet C/2009 P1), 1:82, 4:70, 6:71, 8:13, 10:30

Geminids, 4:70, 10:32

GEMS (Gravity and Extreme Magnetism SMEX) mission, 10:15

geology, change in Earth's as result of life, 11:44–49

geophysics, interview with geophysicist, 1:21

Giant Magellan Telescope Organization, 8:13

GJ 1214b (exoplanet), 6:16

Gliese 581g (exoplanet), 1:31

Global Positioning System (GPS), origin of, 5:32

global warming, human causes for, 6:20

globular clusters

*See also names of specific globular clusters*

discovery of, 2:16



# Astronomy Magazine 2012 Index

---

- distances between stars within, 5:46–47
  - surrounding Milky Way Galaxy, 6:17
- GN-108036 (galaxy), 4:20
- GOE (Great Oxygenation Event) (period in Earth's history), 11:44–49
- GP-B (Gravity Probe B) mission, 3:24–29
- GPS (Global Positioning System), origin of, 5:32
- GRAIL (Gravity Recovery and Interior Laboratory) spacecraft, 1:21, 6:22, 7:15, 10:15
- Gran Sasso National Laboratory, 1:18
- gravitational lensing
  - images of background galaxies, 6:21, 10:53
  - using to study distant quasar, 4:17
- gravity
  - detection of waves at optical wavelengths, 12:22
  - overview of, 5:44
- Gravity and Extreme Magnetism SMEX (GEMS) mission, 10:15
- Gravity Probe B (GP-B) mission, 3:24–29
- Gravity Recovery and Interior Laboratory (GRAIL) spacecraft, 1:21, 6:22, 7:15, 10:15
- GRB 090323 (gamma-ray burst), 3:22
- GRBs (gamma-ray bursts), not responsible for cosmic rays, 8:12
- Great Oxygenation Event (GOE) (period in Earth's history), 11:44–49
- Great Square of Pegasus, 10:35
- Greeley Haven (feature on Mars), 10:63
- green flash, 6:70, 7:11
- Grinspoon, David H., 8:13
- Gyulbudaghian's Nebula, 8:72

## H

- Hagrid's Dragon (NGC 2301) (open cluster), 5:67–71
- HARPS (High Accuracy Radial Velocity Planet Searcher) spectrograph, 1:20
- Hartl-Dengl-Weinberger-2 (HDW 2; Sharpless 2-200) (planetary nebula), 10:48
- HDF850.1 (galaxy), 10:15
- HDW 2 (Hartl-Dengl-Weinberger-2; Sharpless 2-200) (planetary nebula), 10:48
- HE 1104-1804 (quasar), 4:17
- Heart Nebula (IC 1805), 2:70
- Helene (moon of Saturn), 10:28
- heliosphere, bow shock layer of, 9:19
- Helix Nebula (NGC 7293), 5:21, 10:23
- Hellas impact basin (feature on Mars), 10:44
- Herbig-Haro 110 (gas jet), 11:18
- Hercules Cluster (M13) (globular cluster), 5:62
- Herschel Space Observatory
  - image of Carina Nebula, 10:15
  - top 5 discoveries of, 12:44–49
- Higgs boson, 4:22, 5:46, 10:14, 11:50–55
- High Accuracy Radial Velocity Planet Searcher (HARPS) spectrograph, 1:20
- HLX-1 (Hyper-Luminous X-ray source 1) (black hole), 6:20, 11:17
- Holley-Bockelmann, Kelly, 11:22
- Homunculus (nebula), 10:56
- Horsehead Nebula (Barnard 33), 5:8–9
- Hubble Space Telescope
  - aging Sun-like stars in Andromeda Galaxy, 5:22
  - gas jets spurting by young stars, 1:20, 11:18
  - looking deeper with, 7:51
  - number of papers based on data from, 4:20
  - scene of star birth, 8:16

# Astronomy Magazine 2012 Index

---

Humason, Milton LaSalle, 1:52–57  
Hydrogen-alpha ( $H\alpha$ ), image of Sun, 5:67–71  
Hyper-Luminous X-ray source 1 (HLX-1) (black hole), 6:20, 11:17  
hypervelocity planets, 7:15

## I

Iapetus (moon of Saturn), 7:20, 10:32, 11:17  
IBEX. *See* Interstellar Boundary Explorer (IBEX)  
IC 10 (irregular galaxy), 1:17, 12:52  
IC 405 (Flaming Star Nebula), 7:71  
IC 410 (emission nebula), 12:53  
IC 418 (Red Raspberry Nebula) (planetary nebula), 3:14  
IC 443 (Jellyfish Nebula; Sharpless 2-248) (emission nebula), 10:28, 12:53  
IC 447 (reflection nebula), 6:72, 10:30  
IC 1276 (Palomar 7) (globular cluster), 12:53  
IC 1295 (planetary nebula), 12:54  
IC 1311 (star cluster), 8:72  
IC 1396 (emission nebula), 12:54  
IC 1454 (Abell 81) (planetary nebula), 12:54  
IC 1795 (emission nebula), 10:50  
IC 1805 (Heart Nebula), 2:70  
IC 1848 (Baby Nebula), 2:70, 10:59  
IC 2118 (Witch Head Nebula) (reflection nebula), 10:26  
IC 2163 (spiral galaxy), 12:55  
IC 2395 (open cluster), 12:55  
IC 5146 (Cocoon Nebula), 1:81, 10:33, 12:55  
IDCS J1426.5+3508 (galaxy cluster), 10:18  
Index Catalogue objects, 12:52–55  
infrared galaxies, 12:20  
InSight (Interior Exploration using Seismic Investigations, Geodesy and Heat Transport), 7:15, 12:22  
Intergalactic Wanderer (NGC 2419) (globular cluster), 8:71  
International Low Frequency Array (LOFAR) Telescope, 5:17  
International Space Station (ISS), first commercial spacecraft to dock with, 9:16  
Interstellar Boundary Explorer (IBEX)  
    bow shock layer of heliosphere, 9:19  
    interview with principal investigator, 9:18  
    results from third year, 6:18  
interstellar wind, speed of, 6:18  
Io (moon of Jupiter), 2:69, 7:18, 10:54  
IRAS 16293-2422 (star), 12:17  
ISON (Comet C/2012 S1), 12:16  
ISS (International Space Station), first commercial spacecraft to dock with, 9:16

## J

James Clerk Maxwell Telescope (JCMT), 9:15  
James Webb Space Telescope (JWST)  
    budget, 3:21  
    coating of mirrors, 1:19  
    completion of Near Infrared Camera, 8:13  
    completion of steel frame, 3:17  
    Mid-Infrared Instrument, 9:14  
    opposition to funding of, 1:19  
    testing of mirrors, 4:17  
Jellyfish Nebula (Sharpless 2-248; IC 443) (emission nebula), 10:28, 12:53  
Johnson, Thomas J., 7:15

# Astronomy Magazine 2012 Index

---

## Jupiter

*See also names of moons orbiting*

- conjunction with Venus, 11:72
- equatorial clouds, 10:50
- horizontal bands in atmosphere, 12:51
- image of Io crossing Great Red Spot, 2:69
- image of with Moon, 10:22
- image of with Moon and Venus, 10:54
- image of with Venus, 6:71
- planet ejection process, 3:18
- study of atmosphere of, 7:18

JWST. *See* James Webb Space Telescope (JWST)

## K

- Kameny, Frank, 5:17
- Kaspi, Victoria, 4:19
- Keats, John, astronomical allusions in poems of, 1:72
- Kepler, Johannes, 2:53–55
- Kepler space telescope
  - app for following, 8:12
  - discovery of circumbinary planet, 1:23
  - discovery of Earth-sized exoplanets, 4:19, 22
  - extension of mission, 8:13
- Kepler-20e (exoplanet), 4:22
- Kepler-20f (exoplanet), 4:22
- Kepler-21b (exoplanet), 4:19
- Kepler-22b (exoplanet), 3:16
- Kepler-30 (star system), 11:20
- Kepler-36 (star), 10:15
- Kepler-47 (binary star system), 12:17
- KIC 05807616 (KOI 55) (star), 4:18
- KIC 12557548 (star), 9:16
- Kilo-degree Extremely Little Telescope, 10:15
- kinetic energy, 1:12
- King Hamlet's Ghost (NGC 3628) (starburst galaxy), 7:71
- KjPn 8 (planetary nebula), 1:82
- KOI 55 (KIC 05807616) (star), 4:18
- KOI 55.01 (exoplanet), 4:18
- KOI 55.02 (exoplanet), 5:22
- KOI 961 (red dwarf star), 5:22
- Kuiper Belt object (2001 QG298), 2:13

## L

- Lagoon Nebula (M8), 6:8–9
- Landsat program, 11:17
- Large Hadron Collider (LHC)
  - Higgs boson, 10:14
  - overview of, 6:44–47
- Large Magellanic Cloud (LMC)
  - discovery of system analogous to, 12:17
  - effects of collision between Milky Way and Andromeda, 5:47
  - ultramassive stars within, 12:17
- Large Synoptic Survey Telescope (LSST), 11:17
- Late Heavy Bombardment (LHB) (period in Earth's history), 8:14, 11:30–35
- LBN 468 (region of nebulosity), 8:72

# Astronomy Magazine 2012 Index

---

LDN (Lynds Dark Nebula) 588, 10:63  
Leo I (dwarf spheroidal galaxy), 10:28  
Leonids, 11:58–61  
LHB (Late Heavy Bombardment) (period in Earth's history), 8:14, 11:30–35  
LHC. *See* Large Hadron Collider (LHC)  
Lick Observatory, 10:25  
life  
    change in Earth's geology as result of, 11:44–49  
    origin of, role of iron, 10:15  
    search for, 3:17, 4:17  
    search for evidence of on Mars, 8:20–25  
    what happens if extraterrestrial life is found, 5:24–29  
light  
    causes of redshift, 2:44–45  
    magnitude of brightness, 3:50  
light pollution  
    Dark Sky Communities, 3:22  
    fighting, 12:60–62  
    removing from photographs, 1:74  
    20 best dark sky sites in US, 8:60–61  
light pollution reduction (LPR) filters, 7:50–51  
lightning-related signatures, 9:15  
LISA Pathfinder, 3:17  
Little Dumbbell Nebula (M76), 10:31  
LkCa 15 b (exoplanet), 2:19  
LMC. *See* Large Magellanic Cloud (LMC)  
LOFAR (International Low Frequency Array) Telescope, 5:17  
London Stereoscopic Company, 1:58–59  
Lovejoy (Comet C/2011 W3), 5:67–71, 10:58, 12:50  
Lowell Observatory, 11:22  
LPR (light pollution reduction) filters, 7:50–51  
LSST (Large Synoptic Survey Telescope), 11:17  
Luminous Red Galaxy 3-757, 10:53  
lunar eclipses  
    color of, 11:57  
    images of, 4:68, 10:24, 46–47, 49, 11:73  
Lunar Reconnaissance Orbiter, images taken of Apollo landing sites, 1:19  
Lunar X (feature on Moon), 9:12  
Lynds Dark Nebula (LDN) 588, 10:63  
Lyra the Harp (constellation), 7:70

## M

M8 (Lagoon Nebula), 6:8–9  
M9 (globular cluster), 10:55  
M12 (globular cluster), 3:69  
M13 (Hercules Cluster) (globular cluster), 5:62  
M16 (Eagle Nebula), 8:66, 10:29  
M17 (Swan Nebula), 10:29, 35, 12:73  
M31. *See* Andromeda Galaxy (M31)  
M33 (Pinwheel [Triangulum] Galaxy), 3:16, 4:51, 10:15  
M36 (open cluster), 1:80  
M37 (star cluster), 1:80  
M42 (Orion Nebula), 7:16, 10:48, 12:30–35  
M44 (Beehive Cluster), 5:67–71  
M45 (Pleiades; Seven Sisters) (open star cluster), 2:58–59, 10:22, 32, 45, 66, 11:72

# Astronomy Magazine 2012 Index

---

- M53 (globular cluster), 10:30
- M67 (open cluster), 4:64
- M76 (Little Dumbbell Nebula), 10:31
- M78 (reflection nebula), 10:63
- M82 (star burst galaxy), 9:64
- M90 (spiral galaxy), 4:70
- M91 (barred spiral galaxy), 1:82
- M92 (globular cluster), 6:71
- M101 (spiral galaxy), 4:51, 11:73
- magnetic fields
  - of Earth, 6:17
  - magnetic reconnection, 8:18
  - of molecular clouds in Pinwheel Galaxy, 3:16
- magnetism
  - Sun's magnetic ropes, 1:29–30
  - of universe, 5:22
- manned space exploration
  - consideration of human presence in space, 2:26–31
  - 50 years of, 2:20–25
  - Mars, 8:34–35
  - NASA budget, 3:21
  - possible return to Moon, 2:32–35
  - travel to nearest star system, 7:22–27
- Markarian 509 (Mrk 509) (galaxy), 1:18
- Mars
  - See also names of specific missions to*
  - Bonneville Crater, 10:60
  - capability of producing organic carbon, 9:14
  - dust devils, 7:15, 10:25
  - Greeley Haven, 10:63
  - Hellas impact basin, 10:44
  - history of observation and exploration of, 8:44–49
  - image of, 7:71
  - image of with Saturn and Spica, 12:71
  - manned exploration of, 8:34–35
  - marsquakes, 6:17
  - plate tectonics, 12:16
  - possible water on, 1:30–31, 3:17, 8:26–33
  - proposed mission to, 7:15
  - recent missions to, 1:22
  - recreating sounds of, 8:18
  - sand dunes on, 3:17, 5:17, 10:22, 47, 49
  - search for evidence of life on, 8:20–25
  - sounds from, 8:18
  - south pole, 10:34
  - thickness of outermost layer, 9:18
  - water in atmosphere of, 1:22
- Mars Express Orbiter, 1:22, 9:18
- Mars Reconnaissance Orbiter
  - dust devil, 7:15
  - image of sand dunes, 5:17
- Mars Science Laboratory (MSL), 3:18, 4:17
- mascons, 1:21
- May, Brian, 1:58–59, 9:26–35
- McComas, David J., 9:18
- Medusa Nebula (Abell 21; Sharpless 2-274; PK 205+14), 10:62

# Astronomy Magazine 2012 Index

---

- Meinel, Aden, 2:13
- Melosh, Jay, 1:21
- Mercury
  - conjunction with Moon and Uranus, 9:73
  - map of, 10:26
  - MESSENGER mission, 1:27, 2:14, 7:16, 10:26
  - Raditladi impact basin, 10:33
  - rotation pattern, 4:17
  - surface features, 2:14
  - tidal locking, 4:17
- MESSENGER (MErcury Surface, Space ENvironment, GEOchemistry, and Ranging) mission, 1:27, 2:14, 7:16, 10:26
- Messier Marathon, 3:13
- meteorites
  - collecting, 7:52–55
  - explosion of, 8:50
- Milky Way Galaxy
  - collision with Andromeda, 5:47
  - discovery of system analogous to, 12:17
  - dwarf galaxies in neighborhood, 11:22
  - gamma-ray beams, 9:14
  - gamma-ray bubbles, 1:28, 6:49
  - globular clusters surrounding, 6:17
  - image of, 10:30
  - interaction with Sagittarius Dwarf galaxy, 1:24
  - interstellar gas, 2:15
  - mosaic image of, 5:22
  - satellite galaxies, 2:13
- millisecond pulsars, 3:21, 6:22
- Modoc Plateau, California, 4:52–55
- Moldy Strawberry (nebulae), 6:71
- Moon (Earth's)
  - Aristarchus Crater, 10:60–61
  - chemical changes in ice on, 7:15
  - conjunction with Mercury and Uranus, 9:73
  - depth of craters on, 9:50–51
  - expanding surface of, 6:17
  - farside of, 10:64
  - formation of, 7:21
  - GRAIL spacecraft, 1:21, 6:22, 7:15, 10:15
  - ice on, 12:22
  - image of south pole, 6:22
  - image of with Venus and Jupiter, 10:54
  - images of, 3:71, 9:72, 10:22, 25, 27, 46, 12:72
  - Late Heavy Bombardment period, 8:14
  - material lost due to CMEs, 4:22
  - observing during First Quarter, 9:12
  - observing when full, 9:54–55
  - occultation of Venus, 12:72
  - oddities of, 5:12
  - permanently shadowed regions, 5:23
  - possible manned return to, 2:32–35
  - Shackleton Crater, 12:22
  - slowing rotation of, 7:15
  - titanium ore, 2:13
  - Wolf Moon, 10:29
- Moonglow Technologies All Sky Cam, 6:62–63

# Astronomy Magazine 2012 Index

---

moons, why outer planets have more, 11:56. *See also names of specific moons*  
Moore, Patrick, 11:62–65  
motion, overview of, 1:12  
Mount Wilson Observatory, 1:52–57  
Mrk 509 (Markarian 509) (galaxy), 1:18  
MSL (Mars Science Laboratory), 3:18, 4:17  
Muñoz 1 (star cluster), 8:16  
Musket Ball Cluster, 8:12

## N

N44 (nebula), 12:22  
NASA (National Aeronautics and Space Administration)  
    *See also names of specific spacecraft and missions*  
    budget, 3:21  
    50 years of manned space exploration, 2:20–25  
    gift of telescopes from NRO, 10:17  
National Reconnaissance Office (NRO), 10:17  
near-Earth objects (NEOs), plans to discover and catalog, 10:16  
nebulae, how retain heat, 4:50. *See also names of specific nebulae*  
Needle Galaxy (NGC 4565), 8:73  
Neptune, volume of water on, 7:20  
neutrinos  
    blending and morphing, 7:14  
    travelling faster than light, 1:18  
neutron stars  
    in binary systems, 7:20  
    mergers of binary, 1:19  
    mergers of leading to creation of heavy elements, 1:19  
    two distinct populations of, 3:17  
    uneven surface explosions of, 1:21  
NGC 246 (Skull Nebula), 10:51  
NGC 247 (spiral galaxy), 10:25  
NGC 281 (Pacman Nebula) (NGC 281), 3:17  
NGC 613 (spiral galaxy), 2:70  
NGC 772 (galaxy), 10:70  
NGC 869 and NGC 884 (Double Cluster), 9:72  
NGC 1055 (barred spiral galaxy), 4:68  
NGC 1073 (barred spiral galaxy), 6:17  
NGC 1156 (galaxy), 10:70  
NGC 1232 (barred spiral galaxy), 2:67  
NGC 1300 (galaxy), 2:67  
NGC 1499 (California Nebula), 3:70–71  
NGC 1566 (spiral galaxy), 12:71  
NGC 1647 (Pirate Moon Cluster), 1:81  
NGC 1929 (star cluster), 12:22  
NGC 2024 (Flame Nebula), 5:8–9, 11:17  
NGC 2070 (Tarantula Nebula), 3:22, 8:16  
NGC 2100 (open cluster), 10:24  
NGC 2237-9 and NGC 2246 (Rosette Nebula), 6:72, 10:30  
NGC 2264 (Cone Nebula), 6:72, 10:30  
NGC 2301 (Hagrid's Dragon) (open cluster), 5:67–71  
NGC 2419 (Intergalactic Wanderer) (globular cluster), 8:71  
NGC 2477 (open cluster), 2:69  
NGC 2775 (galaxy), 4:64  
NGC 3226 (elliptical galaxy), 5:67–71

# Astronomy Magazine 2012 Index

---

NGC 3227 (spiral galaxy), 5:67–71  
NGC 3239 (irregular galaxy), 6:73  
NGC 3242 (planetary nebula), 6:64  
NGC 3314 (galaxy pair), 10:19  
NGC 3344 (Sliced Onion Galaxy), 5:67–71  
NGC 3372 (Carina Nebula), 6:21, 10:15, 56, 60  
NGC 3393 (spiral galaxy), 10:49  
NGC 3521 (spiral galaxy), 10:54  
NGC 3628 (King Hamlet's Ghost) (starburst galaxy), 7:71  
NGC 4038 and NGC 4039 (Antennae) (colliding galaxies), 10:46  
NGC 4236 (barred spiral galaxy), 2:68  
NGC 4372 (globular cluster), 10:23  
NGC 4435 (galaxy), 10:61  
NGC 4438 (galaxy), 10:61  
NGC 4536 (spiral galaxy), 3:70  
NGC 4565 (Needle Galaxy), 8:73  
NGC 5128 (Centaurus A) (radio galaxy), 9:15, 10:57  
NGC 5139 (Omega Centauri) (globular cluster), 10:51  
NGC 5248 (galaxy), 3:64  
NGC 5426 (spiral galaxy), 10:58  
NGC 5427 (spiral galaxy), 10:58  
NGC 5448 (spiral galaxy), 3:69  
NGC 5466 (globular cluster), 3:64, 5:67–71  
NGC 5897 (globular cluster), 5:62  
NGC 6164-5 (bipolar emission nebula), 10:59  
NGC 6334 (Cat's Paw Nebula), 10:32  
NGC 6339 (barred spiral galaxy), 6:71  
NGC 6384 (spiral galaxy), 11:72  
NGC 6604 (star cluster), 8:13  
NGC 6729 (nebula), 6:64, 10:46  
NGC 6751 (planetary nebula), 7:64  
NGC 6752 (globular cluster), 10:27  
NGC 6772 (planetary nebula), 7:64  
NGC 6888 (Crescent Nebula), 2:71  
NGC 6960/NGC 6992-95 (Veil Nebula), 4:71  
NGC 7000 (North America Nebula), 1:81  
NGC 7023 (reflection nebula), 8:66  
NGC 7293 (Helix Nebula), 5:21, 10:23  
NGC 7331 (spiral galaxy), 3:8–9, 10:34  
NGC 7635 (Bubble Nebula), 7:58–61  
NGC 7814 (Caldwell 43) (spiral galaxy), 4:69  
NGC 7822 (emission nebulae), 3:68  
1999 RQ36 SO (asteroid), 9:15  
Nobel Prize in physics (2011), 1:19  
North America Nebula (NGC 7000), 1:81  
Northern Coalsack (dark nebula), 6:14  
NRO (National Reconnaissance Office), 10:17

## O

observatories. *See names of specific observatories*  
Omega Centauri (NGC 5139) (globular cluster), 10:51  
Oort Cloud, 10:65  
open clusters. *See names of specific open clusters*  
OPERA (Oscillation Project with Emulsion-Racking Apparatus) experiment, 1:18  
Opportunity rover, search for water on Mars, 8:26–33



# Astronomy Magazine 2012 Index

---

Orion (constellation), 1:83  
Orion ED102T CF Triplet telescope, 7:62–63  
Orion Nebula (M42), 7:16, 10:48, 12:30–35  
Orion StarShoot AllSky Camera, 6:63  
Orion StarShoot Deep Space Video Camera, 4:60–61  
Oscillation Project with Emulsion-Racking Apparatus (OPERA) experiment, 1:18

## P

P5 (S/2012 [134340]) (moon of Pluto), 11:16  
Pacman Nebula (NGC 281), 3:17  
Palomar 7 (IC 1276) (globular cluster), 12:53  
Perlmutter, Saul, 1:19  
Philippine Nebula, 7:69  
Phobos-Grunt probe, booster failure, 2:18  
Phoenix galaxy cluster (SPT-CLJ2344-4243), 12:17  
photons, movement of, 1:12  
physics  
    interview with physics professor, 4:19, 11:22  
    Nobel Prize in (2011), 1:19  
Pinwheel Galaxy (Triangulum Galaxy; M33), 3:16, 4:51, 10:15  
Pioneer spacecraft, deceleration anomaly, 11:20  
Pirate Moon Cluster (NGC 1647), 1:81  
PK 85+4.1 (planetary nebula), 7:72  
PK 205+14 (Medusa Nebula; Abell 21; Sharpless 2-274), 10:62  
Planck satellite  
    extension of mission, 8:13  
    microwave images of entire sky, 6:17  
Planet Hunters project, 1:19, 4:17  
planetary nebulae. *See names of specific planetary nebulae*  
planets  
    *See also* extrasolar planets (exoplanets); *names of specific planets*  
    circumbinary, 1:23  
    composition of gas giants, 2:44  
    effects of white dwarf stars on systems of, 3:30–35  
    formation of, 6:17  
    free-floating, 8:51  
    interview with planetary scientist, 3:20  
    planet ejection process, 3:18  
    rogue, 6:24–29  
    roundness of, 10:65  
    tidal locking, 4:51  
plasma, interaction of waves of, 12:17  
Pleiades (Seven Sisters; M45) (open star cluster), 2:58–59, 10:22, 32, 45, 66, 11:72  
Pluto  
    discovery of fifth moon, 11:16  
    occultation of star by, 3:44–49  
Polaris Star Tracker, 8:62–63  
Project 1640 imaging system, 11:19  
protoplanetary disks, 2:12, 11:16  
PS1-11bam (supernova), 12:20  
PSR J0357+3205 (pulsar), 10:29  
PSR J1823-3021 A (millisecond pulsar), 3:21  
PTF 11kx (supernova), 12:16

## Q

# Astronomy Magazine 2012 Index

---

## quasars

- material required to cause glow, 10:14
- measuring, 4:17

## R

- Radiation Assessment Detector (RAD), 4:17
- Radiation Belt Storm Probes (RBSP), 12:18
- radio astronomy, European funding for, 5:17
- RadioNet, 5:17
- Raditladi impact basin (feature on Mercury), 10:33
- rainbows, 10:65
- RBSP (Radiation Belt Storm Probes), 12:18
- RCSGA 032727-132609 (background galaxy), 6:21
- RCW 86 (supernova remnant), 2:18
- Red Raspberry Nebula (IC 418) (planetary nebula), 3:14
- red-giant stars
  - rocky planets in habitable zones of, 7:15
  - super wind and death of, 8:16
- reflection nebulae. *See names of specific reflection nebulae*
- relativity, general theory of, 3:24–29
- Rheasilvia crater (feature on Vesta), 9:18
- Ride, Sally, 11:19
- Riess, Adam G., 1:19
- rogue planets, 6:24–29
- Rosette Nebula (NGC 2237-9 and NGC 2246), 6:72, 10:30
- Rossi X-ray Timing Explorer (RXTE), 5:18
- Rubin, Kate, 8:18

## S

- S/2012 (134340; P5) (moon of Pluto), 11:16
- Sadr (Gamma Cygni) (star), 2:71
- Sagittarius Dwarf galaxy, interaction with Milky Way, 1:24
- satellites. *See names of specific satellites*
- Saturn
  - See also Cassini spacecraft; names of moons orbiting*
  - color change, 12:17
  - illusory appearance of, 5:14
  - image of with Mars and Spica, 12:71
  - storm in atmosphere of, 3:19, 10:22
- Schmidt, Brian P., 1:19
- Schumann Resonance, 9:15
- selenium, found in old star, 9:15
- Sentinel telescope, 10:16
- SETI (Search for Extraterrestrial Intelligence) Institute, 4:17
- Seven Sisters (Pleiades; M45) (open star cluster), 2:58–59, 10:22, 32, 45, 66, 11:72
- Sextans the Sextant (constellation), 4:14
- Shackleton Crater (feature on Moon), 12:22
- Shapley 1 (planetary nebula), 10:26
- Sharpless 2-73 (reflection nebula), 9:71
- Sharpless 2-107 (emission nebula), 2:68
- Sharpless 2-115 (emission nebula), 7:72
- Sharpless 2-136 (Bok globule CB 230), 10:58
- Sharpless 2-183 (nebula), 12:72
- Sharpless 2-200 (Hartl-Dengl-Weinberger-2 [HDW 2]) (planetary nebula), 10:48
- Sharpless 2-239 (emission nebula), 7:73

# Astronomy Magazine 2012 Index

---

- Sharpless 2-240 (Spaghetti Nebula; Simeis 147), 5:67–71, 10:24
- Sharpless 2-242 (emission nebula), 10:24
- Sharpless 2-248 (Jellyfish Nebula; IC 443) (emission nebula), 10:28, 12:53
- Sharpless 2-255, 10:56
- Sharpless 2-256, 10:56
- Sharpless 2-257, 10:56
- Sharpless 2-258, 10:56
- Sharpless 2-263 (emission nebula), 6:71
- Sharpless 2-264, 11:74
- Sharpless 2-274 (Medusa Nebula; Abell 21; PK 205+14), 10:62
- Simeis 147 (Spaghetti Nebula; Sharpless 2-240), 5:67–71, 10:24
- Simon-Miller, Amy, 7:18
- Sirius (star), 10:32, 62
- Skull Nebula (NGC 246), 10:51
- The Sky at Night* (BBC series), 11:62–65
- SkyProdigy 6 telescope, 12:64–65
- Sliced Onion Galaxy (NGC 3344), 5:67–71
- small bodies, study of, 10:18–19
- Small Magellanic Cloud (SMC)
  - discovery of system analogous to, 12:17
  - effects of collision between Milky Way and Andromeda, 5:47
- SN 2005ap (supernova), 1:27–28
- SN 2011fe (supernova), 4:21
- SN Primo (supernova), 5:17
- SNR 0509-67.5 (supernova remnant), 10:57
- social networking, 4:56–57
- SOFIA (Stratospheric Observatory for Infrared Astronomy), 3:44–49
- Solar and Heliospheric Observatory (SOHO), 5:19
- solar eclipses
  - during 2012, 3:52–57, 5:48–49, 9:71–72, 10:44–45, 51, 12:56–59
  - Baily's beads, 7:11
  - determining totality of, 7:50
  - pattern of paths of totality, 3:50
- Solar Orbiter mission, 2:13
- solar system
  - dating of, 7:20
  - formation of, 11:24–29
  - possibility of photo of entire, 9:51
  - study of small bodies in, 10:18–19
  - studying boundary of, 9:18
- SolarMax II 60 Telescope, 5:60–61
- Space Exploration Technologies (SpaceX), launch of Dragon spacecraft, 9:16
- Space Shuttles
  - Discovery transferred to Smithsonian, 8:13
  - last flight of, 1:33
- spacecraft
  - See also names of specific spacecraft*
  - implementing flybys, 12:51
  - preventing contamination from, 11:56–57
- SpaceX (Space Exploration Technologies), launch of Dragon spacecraft, 9:16
- Spaghetti Nebula (Simeis 147; Sharpless 2-240), 5:67–71, 10:24
- Spica (Alpha Virginis) (star), 12:71
- spiral galaxies, earliest, 11:14. *See also names of specific spiral galaxies*
- Spirit rover
  - image of platform from orbit, 10:60
  - search for water on Mars, 8:26–33

# Astronomy Magazine 2012 Index

---

## Spitzer Space Telescope

- extension of mission, 8:13
- infrared background, 10:17

SPT-CLJ2344-4243 (Phoenix galaxy cluster), 12:17

Square Kilometre Array project, 9:18

star clusters, galaxies versus, 6:48. *See also names of specific star clusters*

*Star Trek*, 1:60–63

## stars

*See also names of specific stars; names of specific types of stars*

- appearance of different colored flashes, 7:51
- arsenic and selenium found in old, 9:15
- black holes hindering formation of, 9:15
- blue straggler, 2:13
- causes of redshift, 2:44–45
- companion, 1:19
- complex organic molecules created near, 3:16
- cool planet-sized, 2:18
- distribution of first, 10:17
- fastest rotation, 4:20
- formation from elements other than hydrogen, 2:45
- formation of from recycled gas, 7:17
- formation of in early galaxies, 8:14
- formation of in Tarantula Nebula, 8:16
- formation of massive, 3:51
- formation steps, 7:14
- galactic recycling of star-forming material, 8:18
- gas jets spurted by young, 1:20, 11:18
- image of star trails, 8:71
- metal-poor, 7:16
- O-type, 11:17
- proximity and sharing of material between, 12:50–51
- sugar molecules on gas around, 12:17
- super wind and death of, 8:16
- tellurium within, 6:22

StarShoot Deep Space Video Camera, 4:60–61

Stellavue SV105-3SV apochromatic refractor (APO) telescope, 1:70–71

Stock 1 (open cluster), 7:69

Stock 23 (star cluster), 10:62

Stratospheric Observatory for Infrared Astronomy (SOFIA), 3:44–49

strong nuclear force, 5:44

Summer Triangle (constellation), 8:58–59

## Sun

- coronal mass ejections, 4:22, 5:17
- dark matter, 12:22
- detectability of collisions with, 12:50
- deviation from perfect sphere, 12:20
- flares and prominences, 10:45
- gravitational effect if removed, 7:50
- green flash, 6:70, 7:11
- Hydrogen-alpha image of, 5:67–71
- image of at midnight, 10:47
- images of, 10:53
- loop prominences, 2:70
- magnetic ropes, 1:29–30
- measurement of radius, 7:20
- predicting solar flares, 12:17

# Astronomy Magazine 2012 Index

---

space weather and, 12:21  
spicules, 1:29  
sunspots, 1:30, 10:45  
transit of Venus, 6:12, 13, 50–52, 9:19, 10:47, 48, 11:73, 12:14  
sunspots  
  image of, 10:45  
  weak upcoming cycle, 1:30  
supernovae  
  *See also names of specific supernovae*  
  farthest and oldest known, 5:17  
  first of 2012, 6:73  
  largest sample of, 2:13  
  light echoes from, 6:20  
  most distant, 12:20  
  named for senator, 8:13  
  origins of, 5:17  
  superluminous, 1:27–28  
  type Ia, 4:21, 5:17, 7:44–49, 8:50–51, 12:16  
  type II, 3:22  
Swan Nebula (M17), 10:29, 35, 12:73  
Swift J1644+57 (black hole), 12:17  
Swift satellite, 8:13  
SXP 1062 (pulsar), 10:53

## T

TAAS (The Albuquerque Astronomical Society), 6:21  
Takahashi Teegul Sky-Patrol II tracking mount, 2:56–57  
Tarantula Nebula (NGC 2070), 3:22, 8:16  
telescopes  
  *See also names of specific telescopes*  
  amateur telescope making, 6:60–61  
  light pollution reduction filters, 7:50–51  
  robotic, 3:58–60  
tellurium, 6:22  
Tevatron particle accelerator, 1:24  
30 Doradus (region of star formation), 8:16, 10:27  
Tiangong-1 space laboratory, 1:24  
Titan (moon of Saturn)  
  images of, 4:16, 10:59  
  model of weather cycle, 5:17  
  ocean beneath surface, 10:17  
  sand dunes on, 4:30–35  
TN J0924–220 (radio galaxy), 2:18  
Tombaugh, Patricia, 4:17  
Triangulum Galaxy (Pinwheel Galaxy; M33), 3:16, 4:51, 10:15  
Trojan companion asteroids, 1:29  
TW Hydrae (star), 2:12  
2001 QG298 (Kuiper Belt object), 2:13  
2005 YU<sub>55</sub> (asteroid), 2:19, 3:22  
2010 TK7 (Trojan companion asteroid), 1:29  
TX Piscium (carbon star), 9:73  
Tycho supernova remnant, 4:17

## U

UCF-1.01 (exoplanet), 11:17

# Astronomy Magazine 2012 Index

---

UKS 1 (globular cluster), 2:16

universe

age of, 11:57

distribution of matter within, 12:17

expansion of, 7:15

infinite nature of, 4:51, 11:10, 57

magnetism of, 5:22

use of chemistry in research into, 1:33

Uranus

aurorae, 8:15

causes of tilt, 2:12

conjunction with Moon and Mercury, 9:73

volume of water on, 7:20

## V

V1331 Cygni (star), 3:69

van den Bergh 1 (reflection nebula), 1:16–17

van den Bergh 19 (Flying Ghost Nebula) (reflection nebula), 5:67–71

van den Bergh 38 (reflection nebula), 6:71

van den Bergh 137 (reflection nebula), 7:72

van den Bergh 138 (reflection nebula), 7:72

van den Bergh 149 (reflection nebula), 4:69

van den Bergh 150 (reflection nebula), 4:69

Vega (Alpha Lyrae) (star), 8:58–59

Veil Nebula (NGC 6960/NGC 6992-95), 4:71

Venus

conjunction with Jupiter, 11:72

image of with Jupiter, 6:71

image of with Moon and Jupiter, 10:54

images of, 10:44, 45

length of day on, 6:23

occultation of by Moon, 12:72

ozone, 2:12

recreating sounds of, 8:18

slow rotation of, 5:46

sounds from, 8:18

transit of, 6:12, 13, 50–52, 9:19, 10:47, 48, 11:73, 12:14

Venus Express spacecraft, 8:18

Very Large Array (VLA), 5:17

Very Large Telescope (VLT), ESO, 10:46–47, 55

Vesta (asteroid)

Dawn spacecraft approaches, 4:18

Dawn spacecraft leaves, 12:17

image of, 10:52

results from Dawn spacecraft, 8:13

Rheasilvia crater, 9:18

VISTA (Visible and Infrared Survey Telescope for Astronomy), 5:21

VISTA Variables in the Via Lactea (VVV) survey, 2:16

Vixen Polaris Star Tracker, 8:62–63

VLA (Very Large Array), 5:17

VLT (Very Large Telescope), ESO, 10:46–47, 55

Voyager spaceprobes

bow shock layer of heliosphere, 9:19

distance from interstellar space, 8:18

VVV (VISTA Variables in the Via Lactea) survey, 2:16

# Astronomy Magazine 2012 Index

---

VVV CL001 (globular cluster), 2:16

## W

water

- comets as possible source of, 2:17
- on Europa, 3:20
- on exoplanets, 6:16
- on Mars, 1:22, 30–31, 3:17, 8:26–33
- on Neptune, 7:20
- origin of, 7:28–35
- search for water on, 8:26–33
- on Uranus, 7:20

weak nuclear force, 5:45

white dwarfs

- collisions between, 8:50–51
- formation of, 3:30–35
- oldest known, 8:13

wireless Internet, origin of, 5:33

WISE (Wide-field Infrared Survey Explorer) space telescope, 1:24, 3:30–35, 5:22

WISE J180956.27-330500.2 (star), 9:15

Witch Head Nebula (IC 2118) (reflection nebula), 10:26

women, in astronomy, 8:10

## Y

Yarkovsky effect, 9:15

## Z

Zooniverse community, 4:17

## **Title Index**

### A

- Accessible astronomy, 8:64
- Admire an archetypal barred spiral, 6:17
- All about the Bubble Nebula, 7:58–61
- ALMA opens its eyes, 2:13
- Ancient Mars may have had watery underground, 3:17
- Another Pluto moon found, 11:16
- Another super-Earth, 6:22
- Asteroid family tree, 9:18
- Astronomers detect dark matter string, 11:18
- Astronomers find rectangular galaxy, 7:14
- Astronomers find two star-forged planets, 4:18
- Astronomers spot earliest spiral galaxy, 11:16
- Astronomy* announces 2011 Out-of-this-world Award winner, 6:21
- Astronomy* tests Celestron's SkyProdigy 6, 12:64–65
- Astronomy* tests Coronado's SolarMax II Telescope, 5:60–61
- Astronomy* tests Orion's color video camera, 4:60–61
- Astronomy* tests Orion's grab-and-go refractor, 7:62–63
- Astronomy* tests Stellarvue's 4-inch APO refractor, 1:70–71
- Astronomy* tests two all-sky cameras., 6:62–63

# Astronomy Magazine 2012 Index

---

*Astronomy* tests two tracking mounts, 2:56–57  
*Astronomy* tests Vixen's compact astroimaging mount, 8:62–63  
*Astronomy's* third annual Star Products, 9:56–63  
Atmosphere of Mars supersaturated with water, 1:22  
August supernova offers cosmic clues, 4:21

## B

A beauty and her "beasts", 1:16–17  
Beauty behind blue cirrus, 3:8–9  
Believe it?, 9:10  
Biggest Full Moon, 5:12  
Black holes in our backyard, 9:44–49  
Black hole's inner workings surprise astronomers, 1:18  
The blue beads of sunset, 7:11  
Brian May, 9:26–35  
Brian May's world of stereo astro pictures, 1:58–59  
Bright blast lights up surprises, 3:22

## C

Capturing celestial crinoline, 10:66  
Capturing star formation in the act, 7:14  
Cash and infinity, 2:10  
Cassini captures multiple moons, 4:16  
Cassini chronicles Saturn storm, 3:19  
Celebrate an astronomical holiday, 4:13  
Cellphone digiscoping, 10:12  
The century's last Venus transit, 9:19  
Chasing the curve, 4:62  
A checklist for astrophotography, 6:15  
China takes another step into space, 1:24  
Cold days in the Carina Nebula, 10:15  
Collision consequences, 1:24  
Comet hints at possible source of Earth's water, 2:17  
Cosmic phantoms, 3:12  
Create the ultimate observing charts for free, 3:61–63  
Curiosity is on its way to Mars, 3:18  
Curiosity's first day on Mars, 12:24–29

## D

Dare to stare at the "evil eye", 11:14  
Dark energy's new face, 7:44–49  
Dark matter grows more mysterious, 2:13  
Dark matter spreads through space, 6:22  
Dawn moves closer to Vesta, 4:18  
Dawn relays results from Vesta, 8:13  
Dead stars and doomed planets, 3:30–35  
Deep-freeze astronomy, 2:11  
Did life change Earth's geology?, 11:44–49  
Dino-killer mystery, 1:24  
Discovery provides new benchmark for brown dwarfs, 9:15  
A distant galaxy, magnified, 6:21  
Do billions of rogue planets drift through space?, 6:24–29  
Doomed gas cloud approaches black hole, 4:16  
Dozens of extrasolar planets discovered, 1:20



# Astronomy Magazine 2012 Index

---

## E

The Eagle Nebula and NGC 7023, 8:66  
Early galaxies formed stars differently, 8:14  
Early galaxy shows odd complexity, 2:18  
Earth-sized worlds discovered around Sun-like star, 4:22  
Enceladus is a snowy moon, 2:18  
The end of the U.S. particle accelerator, 1:24  
Eris in the spotlight, 2:15  
Europa may harbor subsurface lakes, 3:20  
Even dwarf galaxies gobble other dwarfs, 6:16  
Evidence that Titan harbors an ocean, 10:17  
Explore 10 spring galaxies, 5:50–53  
Explore the Summer Triangle, 8:58–59  
Exploring Fomalhaut's planetary system, 8:17  
Extremely bright infrared galaxies found, 12:20

## F

Faint jets suggest past Milky Way activity, 9:14  
Fiery chaos in our galaxy, 2:15  
50 years of Americans in space, 2:20–25  
5 top discoveries of the Herschel Space Observatory, 12:44–49  
Fixing oval stars, 12:66  
Flying in Pluto's shadow, 3:44–49  
Found: a star that vaporizes its world, 9:17  
Found: more globular clusters in the Milky Way, 2:16  
A foundation for the stars, 1:14

## G

Gaining perspective on a galactic "crash", 10:18  
Galactic magnetism may influence star birth, 3:16  
Galaxy cluster breaks records, 5:22  
Gamma-ray bursts not responsible for extreme cosmic rays, 8:12  
Gassy halos allow lasting star birth, 3:22  
Gazing into the Swan's nest, 5:21  
Getting the most with a DSLR, 11:66  
Gift from spy agency, 10:17  
Gifts from *The Twilight Zone*, 12:10  
A glowing superbubble, 12:22  
Gravitational waves confirmed, 12:22  
Guiding the light, 5:15

## H

Haunting Prague with Kepler and Tycho, 2:53–55  
Have particles broken the speed limit?, 1:18  
"HDR Toning," part 2, 8:65  
The Helix in a new light, 5:21  
Historic launch to ISS, 9:16  
Hoping for clear June 5 skies, 6:13  
Horsehead of a different color, 5:8–9  
How humans will travel to Alpha Centauri, 7:22–27  
How I take pictures, 9:66  
How London created a big-city astro club, 5:54–57  
How robotic telescopes are changing astronomy, 3:58–60  
How the constellations came to be, 4:58–59

# Astronomy Magazine 2012 Index

---

How the Orion Nebula works, 12:30–35  
How the solar system came to be, 11:24–29  
How the universe reveals its secrets, 1:34–39  
How to collect rocks from space, 7:52–55  
How to sketch deep-sky objects, 1:64–68  
How to view June's rare Venus transit, 6:50–52  
How twin rovers found water on Mars, 8:26–33  
How we know black holes exist, 4:24–29  
How we'll get to Mars, 8:34–35  
How you can fight light pollution, 12:60–62  
Hubble captures star activity in motion, 1:20  
Hungriest black holes thwart star growth, 9:15

## I

IBEX samples interstellar wind, 6:18  
Ice giants may contain more water volume, 7:20  
Imaging heaven & Earth, 8:52–57  
Infinite universe, 11:10  
Infrared observatories peer behind the dust, 7:17  
Infrared view spies nebula's inner details, 3:17  
Inside nature's fundamental forces, 5:44–45  
Inside the world's most powerful machine, 6:44–47  
Is telescope making dead?, 6:60–61

## K

Kepler uncovers planet orbiting two stars, 1:23

## L

Lack of dark matter surprises scientists, 8:15  
The last of the biggies..., 6:12  
Lighting up the Flame Nebula, 11:17  
Local dark matter, 12:22  
A longer Late Heavy Bombardment?, 8:14  
Lunar crater is full of ice, 12:22  
Lunar formation idea may be wrong, 7:21  
Lunar letters, 9:12

## M

M13 and NGC 5897, 5:62  
M36 and M37, 1:80  
M67 and NGC 2775, 4:64  
M82: The "marquee" galaxy, 9:64  
The man who measured the cosmos, 1:52–57  
Mars capable of producing organic carbon, 9:14  
Mars dust devil cleans surface, 7:15  
Massive stars have partners, 11:17  
Medium black hole once a dwarf galaxy's heart., 6:20  
Mercury's newest surface features, 2:14  
MESSENGER completes first year, moves to second, 7:16  
Messing up, 4:12  
Milky Way's black hole snacks on asteroids, 6:18  
Millisecond pulsars put on the brakes, 6:22  
The miracle of Lab Color, 2:62  
Missing galaxies?, 11:22

# Astronomy Magazine 2012 Index

---

Mission launches to study magnetic activity, 12:18  
Model burster, 7:20  
The Modoc Plateau beckons amateur astronomers, 4:52–55  
Monster black holes measured, 4:22  
More worlds with two suns discovered, 5:16  
The mystery of daylight aurorae, 8:11

## N

Navigate a jovian hellscape, 7:20  
Neil Armstrong: a "reluctant hero", 12:18  
New clue helps explain supernovae, 3:22  
New comet will light up the sky, 12:16  
New image hints at chain reaction star formation, 5:22  
New insights into stellar death, 8:16  
New Mars mission, 12:22  
New particle discovered - likely the Higgs boson, 10:14  
New type of planet discovered, 6:16  
New views of lunar farside, 6:22  
A new way to search for asteroids, 10:16  
NGC 1232 and NGC 1300, 2:67  
NGC 3242 and NGC 6729, 6:64  
NGC 5248 and NGC 5466, 3:64  
NGC 6751 and NGC 6772, 7:64  
NGC 772 and NGC 1156, 10:70

## O

Observatories capture star-forming region in different light, 3:22  
Observatories spy a comet's death, 5:19  
Observe the Leonid meteor shower, 11:58–61  
Oceans of water surround protoplanetary cloud, 2:12  
Odd galaxy from an early cosmic era, 4:20  
Odd pulsar, 11:22  
"Of pure ablation round earth's human shores", 1:72  
Old data, new find, 2:18  
Old system challenges planet formation theory, 7:16  
100 greatest pictures of the universe, 10:20–35, 44–63  
The onset of the Little Ice Age, 6:22

## P

Particle hunt, 4:22  
Peering past a galaxy's dark dust, 9:16  
The Pioneer anomaly - solved?, 11:20  
Pioneering astronaut Sally Ride dies, 11:19  
Planck studies the microwave galaxy, 6:17  
Planetary dating, 7:20  
Poetry of motion, 1:12  
Portrait of a stellar nursery, 6:8–9  
Probing Einstein's relativity, 3:24–29  
Probing Titan's seas of sand, 4:30–35

## Q

Quest for the most distant objects, 9:20–25

## R

# Astronomy Magazine 2012 Index

---

The raspberry "beret", 3:13  
Recurrent novae lead to supernovae, 12:16  
The Red Planet's colorful past, 8:44–49  
Replenishing star formation reserves, 7:17  
Researchers learn details of Cygnus X-1's black hole, 4:17  
Restrictions lifted on Earth-like planets, 10:15  
Rethinking dark matter, 7:18  
Russian Mars probe goes dead, 2:18

## S

Sandy stretches on our planetary neighbor, 5:17  
A satellite's finale, 5:18  
Saturn "squared"?, 5:14  
Saturn's color transformation, 12:17  
The science of *Star Trek*, 1:60–63  
Scientists capture dark-matter detail, 5:18  
Scientists capture planet as it forms, 2:19  
Scientists confirm most Earth-like planet, 3:16  
Scientists find a star system similar to ours, 11:21  
Scientists measure extremely distant quasar, 4:17  
Scientists trace dark energy's effects, 7:15  
Scope's dual location, 9:18  
Search for supernova origins, 5:17  
The secret of Sextans, 4:14  
Sharing the Adirondack sky, 2:60  
Shedding light on the Moon's shadows, 5:23  
Six nights under Namibia's dark skies, 6:53–59  
The 6 most important numbers in the universe, 6:30–35  
Slower, older collision reveals dark matter, 8:12  
Snacks energize normal quasars, 10:14  
The solar system's "softer" edge., 9:19  
Space: women needn't apply?, 8:10  
Speaking "Astronomese", 7:12  
A spectacular nursery unveiled, 6:21  
Spot a near-Earth asteroid, 2:48–49  
Spring binary showpieces, 5:13  
Star party standouts, 12:12  
Still a ways to go, 8:18  
The Sun erodes the Moon, 4:22  
The super secret sky, 2:58–59  
Supernova remnant mystery solved, 2:18

## T

A tale of two marathons, 3:13  
Taming a bright star, 10:68  
Taming bright stars, 1:74  
Telescopes nab near-Earth asteroid, 3:22  
10 great hits from an obscure catalog, 12:52–55  
10 great spring binocular sights, 5:58–59  
10 great winter binocular sights, 2:46–47  
10 years at the helm, 11:12  
13 great summer Binocular sights, 7:56–57  
Three cosmologists win the 2011 Nobel Prize in physics, 1:19  
Three smallest exoplanets found, 5:22  
Tone your image using HDR, 7:13

# Astronomy Magazine 2012 Index

---

Totality rules Down, 12:56–59  
Tour our wet solar system, 7:28–35  
The transit of Venus, 12:14  
True colors, 10:10  
Turning clouds of darkness into stars of light, 4:44–49  
2011 top 10 space stories, 1:24  
2012: a historic year for solar eclipses, 3:52–57  
20 best dark-sky sites in the U.S., 8:60–61

## U

Ultra-blue stars swarm Andromeda, 5:22  
Unexpected arc has massive consequences, 10:18  
Universe's magnetism explained in lab, 5:22  
Unusual binary systems become easier to spot, 5:16  
Unusual galaxy cluster furiously forms stars, 12:17  
Up close star formation, 8:16  
Uranus aurorae, 8:15  
Uranus' tilt: multiple impacts, 2:12  
Use Facebook to get more out of your hobby, 4:56–57

## V

Venus' day gets longer, 6:23  
Venusian oddity, 8:18  
Venusian voices, 8:18  
View May's unusual solar eclipse, 5:48–49  
View the stars under Earth's darkest sky, 2:50–52  
Visiting Britain's legendary Patrick Moore., 11:62–65

## W

Waking up with conjunction-itis, 7:10  
A walnut's ridge, 7:20  
Wander the wonders of the King's constellation, 9:52–53  
What are the current "big ideas" about exoplanets?, 5:20  
What are we doing in space?, 2:26–31  
What happens when we detect alien life?, 5:24–29  
What has astronomy done for you lately?, 5:30–35  
What to do about satellite trails, 3:15  
When Earth felt cosmic rain, 11:30–35  
Where is the Northern Coalsack?, 6:14  
Whiff of the first stars?, 10:17  
Why you should care about Higgs boson!, 11:50–55  
Will Curiosity find life on Mars?, 8:20–25  
Will we go back to the moon?, 2:32–35

## X

X-ray flare changes exoplanet's atmosphere, 10:16

## Y

You should observe the Full Moon!, 9:54–55  
A young cluster's heated environment, 8:13  
Young solar system lost a giant planet, 3:18  
Young stars make waves, 11:18  
Youngest and brightest millisecond pulsar yet, 3:21

## Author Index

### A

Andrews, Bill

- Admire an archetypal barred spiral, 6:17
- Astronomers detect dark matter string, 11:18
- Astronomers find rectangular galaxy, 7:14
- Astronomers find two star-forged planets, 4:18
- Astronomers spot earliest spiral galaxy, 11:16
- Astronomy* announces 2011 Out-of-this-world Award winner, 6:21
- Atmosphere of Mars supersaturated with water, 1:22
- August supernova offers cosmic clues, 4:21
- Black hole's inner workings surprise astronomers, 1:18
- Bright blast lights up surprises, 3:22
- Capturing star formation in the act, 7:14
- China takes another step into space, 1:24
- Curiosity's first day on Mars, 12:24–29
- Doomed gas cloud approaches black hole, 4:16
- Early galaxy shows odd complexity, 2:18
- Eris in the spotlight, 2:15
- Exploring Fomalhaut's planetary system, 8:17
- Faint jets suggest past Milky Way activity, 9:14
- Fiery chaos in our galaxy, 2:15
- 50 years of Americans in space, 2:20–25
- Gaining perspective on a galactic "crash", 10:18
- Galactic magnetism may influence star birth, 3:16
- Gassy halos allow lasting star birth, 3:22
- Gazing into the Swan's nest, 5:21
- How humans will travel to Alpha Centauri, 7:22–27
- How the universe reveals its secrets, 1:34–39
- Hubble captures star activity in motion, 1:20
- Hungriest black holes thwart star growth, 9:15
- Infrared view spies nebula's inner details, 3:17
- Lack of dark matter surprises scientists, 8:15
- Lighting up the Flame Nebula, 11:17
- Lunar crater is full of ice, 12:22
- Lunar formation idea may be wrong, 7:21
- Mars capable of producing organic carbon, 9:14
- Medium black hole once a dwarf galaxy's heart., 6:20
- Milky Way's black hole snacks on asteroids, 6:18
- Navigate a jovian hellscape, 7:20
- New clue helps explain supernovae, 3:22
- New insights into stellar death, 8:16
- New type of planet discovered, 6:16
- New views of lunar farside, 6:22
- Oceans of water surround protoplanetary cloud, 2:12
- Pioneering astronaut Sally Ride dies, 11:19
- Restrictions lifted on Earth-like planets, 10:15
- Rethinking dark matter, 7:18
- Russian Mars probe goes dead, 2:18
- Sandy stretches on our planetary neighbor, 5:17
- Scientists measure extremely distant quasar, 4:17
- Shedding light on the Moon's shadows, 5:23
- The 6 most important numbers in the universe, 6:30–35

# Astronomy Magazine 2012 Index

---

Unexpected arc has massive consequences, 10:18  
Universe's magnetism explained in lab, 5:22  
Unusual binary systems become easier to spot, 5:16  
Unusual galaxy cluster furiously forms stars, 12:17  
Up close star formation, 8:16  
Why you should care about Higgs boson!, 11:50–55  
Young solar system lost a giant planet, 3:18

## B

Bakich, Michael E.

Explore 10 spring galaxies, 5:50–53  
Explore the Summer Triangle, 8:58–59  
How the constellations came to be, 4:58–59  
Is telescope making dead?, 6:60–61  
New comet will light up the sky, 12:16  
Observe the Leonid meteor shower, 11:58–61  
100 greatest pictures of the universe, 10:20–35, 44–63  
20 best dark-sky sites in the U.S., 8:60–61  
Use Facebook to get more out of your hobby, 4:56–57  
Wander the wonders of the King's constellation, 9:52–53  
You should observe the Full Moon!, 9:54–55

Bell, Jim

Will Curiosity find life on Mars?, 8:20–25

Bennett, Simon

How London created a big-city astro club, 5:54–57

Berman, Bob

Believe it?, 9:10  
Biggest Full Moon, 5:12  
Cash and infinity, 2:10  
Cosmic phantoms, 3:12  
Gifts from *The Twilight Zone*, 12:10  
Infinite universe, 11:10  
The last of the biggies..., 6:12  
Messing up, 4:12  
Poetry of motion, 1:12  
Space: women needn't apply?, 8:10  
True colors, 10:10  
Waking up with conjunction-itis, 7:10

Besemer, Ayla

The science of *Star Trek*, 1:60–63

Boren, Harel

Six nights under Namibia's dark skies, 6:53–59

Burnham, Robert

How twin rovers found water on Mars, 8:26–33

## C

Carroll, Michael

Tour our wet solar system, 7:28–35

Chaple, Glenn

Accessible astronomy, 8:64  
Celebrate an astronomical holiday, 4:13  
Cellphone digiscoping, 10:12  
Deep-freeze astronomy, 2:11  
A foundation for the stars, 1:14  
Hoping for clear June 5 skies, 6:13

# Astronomy Magazine 2012 Index

---

Lunar letters, 9:12  
Speaking "Astronomese", 7:12  
Spring binary showpieces, 5:13  
Star party standouts, 12:12  
A tale of two marathons, 3:13  
10 years at the helm, 11:12

Clark, Stuart

Visiting Britain's legendary Patrick Moore., 11:62–65

## D

Debes, John H.

Dead stars and doomed planets, 3:30–35

Dorminey, Bruce

Turning clouds of darkness into stars of light, 4:44–49

Doyle, Brandon

How to sketch deep-sky objects, 1:64–68

## E

Eales, Steve

5 top discoveries of the Herschel Space Observatory, 12:44–49

Edberg, Steve

*Astronomy* tests Orion's grab-and-go refractor, 7:62–63

Eicher, David J.

Brian May, 9:26–35

Brian May's world of stereo astro pictures, 1:58–59

The Eagle Nebula and NGC 7023, 8:66

Haunting Prague with Kepler and Tycho, 2:53–55

M13 and NGC 5897, 5:62

M36 and M37, 1:80

M67 and NGC 2775, 4:64

NGC 772 and NGC 1156, 10:70

NGC 1232 and NGC 1300, 2:67

NGC 3242 and NGC 6729, 6:64

NGC 5248 and NGC 5466, 3:64

NGC 6751 and NGC 6772, 7:64

## F

Ferron, Karri

ALMA opens its eyes, 2:13

Ancient Mars may have had watery underground, 3:17

Cassini chronicles Saturn storm, 3:19

Cold days in the Carina Nebula, 10:15

Dawn relays results from Vesta, 8:13

Discovery provides new benchmark for brown dwarfs, 9:15

Earth-sized worlds discovered around Sun-like star, 4:22

Galaxy cluster breaks records, 5:22

The Helix in a new light, 5:21

Kepler uncovers planet orbiting two stars, 1:23

Mars dust devil cleans surface, 7:15

Neil Armstrong: a "reluctant hero", 12:18

Observatories spy a comet's death, 5:19

Old system challenges planet formation theory, 7:16

Peering past a galaxy's dark dust, 9:16

The Red Planet's colorful past, 8:44–49

Saturn's color transformation, 12:17



# Astronomy Magazine 2012 Index

---

- Scientists capture planet as it forms, 2:19
- Scientists find a star system similar to ours, 11:21
- Slower, older collision reveals dark matter, 8:12
- Telescopes nab near-Earth asteroid, 3:22
- Three smallest exoplanets found, 5:22
- Ultra-blue stars swarm Andromeda, 5:22
- Uranus aurorae, 8:15
- Venus' day gets longer, 6:23
- What are the current "big ideas" about exoplanets?, 5:20
- X-ray flare changes exoplanet's atmosphere, 10:16
- Fienberg, Richard Tresch
  - Flying in Pluto's shadow, 3:44–49
- Frank, Adam
  - Quest for the most distant objects, 9:20–25

## G

- Genet, Russell M.
  - How robotic telescopes are changing astronomy, 3:58–60
- Goldstein, Alan
  - Create the ultimate observing charts for free, 3:61–63
  - 10 great hits from an obscure catalog, 12:52–55

## H

- Hallas, Tony
  - Astronomy* tests two tracking mounts, 2:56–57
  - Chasing the curve, 4:62
  - A checklist for astrophotography, 6:15
  - Fixing oval stars, 12:66
  - Getting the most with a DSLR, 11:66
  - Guiding the light, 5:15
  - "HDR Toning," part 2, 8:65
  - How I take pictures, 9:66
  - The miracle of Lab Color, 2:62
  - The Modoc Plateau beckons amateur astronomers, 4:52–55
  - Taming a bright star, 10:68
  - Taming bright stars, 1:74
  - Tone your image using HDR, 7:13
  - What to do about satellite trails, 3:15
- Harrington, Phil
  - Astronomy's* third annual Star Products, 9:56–63
  - 10 great spring binocular sights, 5:58–59
  - 10 great winter binocular sights, 2:46–47
  - 13 great summer Binocular sights, 7:56–57

## J

- James, C. Renée
  - What has astronomy done for you lately?, 5:30–35

## K

- Kardel, Scott
  - How you can fight light pollution, 12:60–62
- Kruesi, Liz
  - Another Pluto moon found, 11:16
  - Another super-Earth, 6:22

# Astronomy Magazine 2012 Index

---

Asteroid family tree, 9:18  
Cassini captures multiple moons, 4:16  
The century's last Venus transit, 9:19  
Collision consequences, 1:24  
Comet hints at possible source of Earth's water, 2:17  
Curiosity is on its way to Mars, 3:18  
Dark matter grows more mysterious, 2:13  
Dark matter spreads through space, 6:22  
Dawn moves closer to Vesta, 4:18  
Dino-killer mystery, 1:24  
A distant galaxy, magnified, 6:21  
Dozens of extrasolar planets discovered, 1:20  
Early galaxies formed stars differently, 8:14  
Enceladus is a snowy moon, 2:18  
The end of the U.S. particle accelerator, 1:24  
Europa may harbor subsurface lakes, 3:20  
Even dwarf galaxies gobble other dwarfs, 6:16  
Evidence that Titan harbors an ocean, 10:17  
Extremely bright infrared galaxies found, 12:20  
Found: a star that vaporizes its world, 9:17  
Found: more globular clusters in the Milky Way, 2:16  
Gamma-ray bursts not responsible for extreme cosmic rays, 8:12  
Gift from spy agency, 10:17  
A glowing superbubble, 12:22  
Gravitational waves confirmed, 12:22  
Have particles broken the speed limit?, 1:18  
Historic launch to ISS, 9:16  
How we know black holes exist, 4:24–29  
IBEX samples interstellar wind, 6:18  
Ice giants may contain more water volume, 7:20  
Infrared observatories peer behind the dust, 7:17  
Inside the world's most powerful machine, 6:44–47  
Local dark matter, 12:22  
A longer Late Heavy Bombardment?, 8:14  
Massive stars have partners, 11:17  
MESSENGER completes first year, moves to second, 7:16  
Millisecond pulsars put on the brakes, 6:22  
Missing galaxies?, 11:22  
Mission launches to study magnetic activity, 12:18  
Model burster, 7:20  
Monster black holes measured, 4:22  
More worlds with two suns discovered, 5:16  
New image hints at chain reaction star formation, 5:22  
New Mars mission, 12:22  
New particle discovered - likely the Higgs boson, 10:14  
A new way to search for asteroids, 10:16  
Observatories capture star-forming region in different light, 3:22  
Odd galaxy from an early cosmic era, 4:20  
Odd pulsar, 11:22  
Old data, new find, 2:18  
The onset of the Little Ice Age, 6:22  
Particle hunt, 4:22  
The Pioneer anomaly - solved?, 11:20  
Planck studies the microwave galaxy, 6:17  
Planetary dating, 7:20  
Probing Einstein's relativity, 3:24–29

# Astronomy Magazine 2012 Index

---

Recurrent novae lead to supernovae, 12:16  
Replenishing star formation reserves, 7:17  
Researchers learn details of Cygnus X-1's black hole, 4:17  
A satellite's finale, 5:18  
Scientists capture dark-matter detail, 5:18  
Scientists confirm most Earth-like planet, 3:16  
Scientists trace dark energy's effects, 7:15  
Scope's dual location, 9:18  
Search for supernova origins, 5:17  
Snacks energize normal quasars, 10:14  
The solar system's "softer" edge., 9:19  
A spectacular nursery unveiled, 6:21  
Still a ways to go, 8:18  
The Sun erodes the Moon, 4:22  
Supernova remnant mystery solved, 2:18  
Three cosmologists win the 2011 Nobel Prize in physics, 1:19  
2011 top 10 space stories, 1:24  
Uranus' tilt: multiple impacts, 2:12  
Venusian oddity, 8:18  
Venusian voices, 8:18  
A walnut's ridge, 7:20  
When Earth felt cosmic rain, 11:30–35  
Whiff of the first stars?, 10:17  
A young cluster's heated environment, 8:13  
Young stars make waves, 11:18  
Youngest and brightest millisecond pulsar yet, 3:21  
Kuchner, Marc J.  
Dead stars and doomed planets, 3:30–35

## L

Levy, David H.  
"Of pure ablution round earth's human shores", 1:72  
Sharing the Adirondack sky, 2:60  
Lopes, Rosaly  
Probing Titan's seas of sand, 4:30–35

## M

May, Brian  
What are we doing in space?, 2:26–31

## N

Nadis, Steve  
Dark energy's new face, 7:44–49  
Do billions of rogue planets drift through space?, 6:24–29

## O

O'Dell, C. Robert  
How the Orion Nebula works, 12:30–35  
O'Meara, Stephen James  
A beauty and her "beasts", 1:16–17  
The blue beads of sunset, 7:11  
Capturing celestial crinoline, 10:66  
Dare to stare at the "evil eye", 11:14  
M82: The "marquee" galaxy, 9:64

# Astronomy Magazine 2012 Index

---

The mystery of daylight aurorae, 8:11  
The raspberry "beret", 3:13  
Saturn "squared"?, 5:14  
The secret of Sextans, 4:14  
The super secret sky, 2:58–59  
The transit of Venus, 12:14  
Where is the Northern Coalsack?, 6:14

## P

Pacholka, Wally  
  Imaging heaven & Earth, 8:52–57  
Polakis, Tom  
  View the stars under Earth's darkest sky, 2:50–52

## R

Ralph, Jolyon  
  Did life change Earth's geology?, 11:44–49  
Reynolds, Mike  
  *Astronomy* tests Coronado's SolarMax II Telescope, 5:60–61  
  How to collect rocks from space, 7:52–55

## S

Schur, Chris  
  *Astronomy* tests Orion's color video camera, 4:60–61  
Shostak, Seth  
  What happens when we detect alien life?, 5:24–29  
Shubinski, Raymond  
  All about the Bubble Nebula, 7:58–61

## T

Talbot, Jon  
  *Astronomy* tests Stellarvue's 4-inch APO refractor, 1:70–71  
Talcott, Richard  
  Black holes in our backyard, 9:44–49  
  How the solar system came to be, 11:24–29  
  How to view June's rare Venus transit, 6:50–52  
  How we'll get to Mars, 8:34–35  
  Inside nature's fundamental forces, 5:44–45  
  Mercury's newest surface features, 2:14  
  Spot a near-Earth asteroid, 2:48–49  
  Totality rules Down Under, 12:56–59  
  2012: a historic year for solar eclipses, 3:52–57  
  View May's unusual solar eclipse, 5:48–49  
Trusock, Tom  
  *Astronomy* tests Celestron's SkyProdigy 6, 12:64–65  
  *Astronomy* tests two all-sky cameras., 6:62–63  
  *Astronomy* tests Vixen's compact astroimaging mount, 8:62–63

## V

Voller, Ron L.  
  The man who measured the cosmos, 1:52–57

## Z

# Astronomy Magazine 2012 Index

---

Zimmerman, Robert

Will we go back to the moon?, 2:32–35