

Holiday word challenge

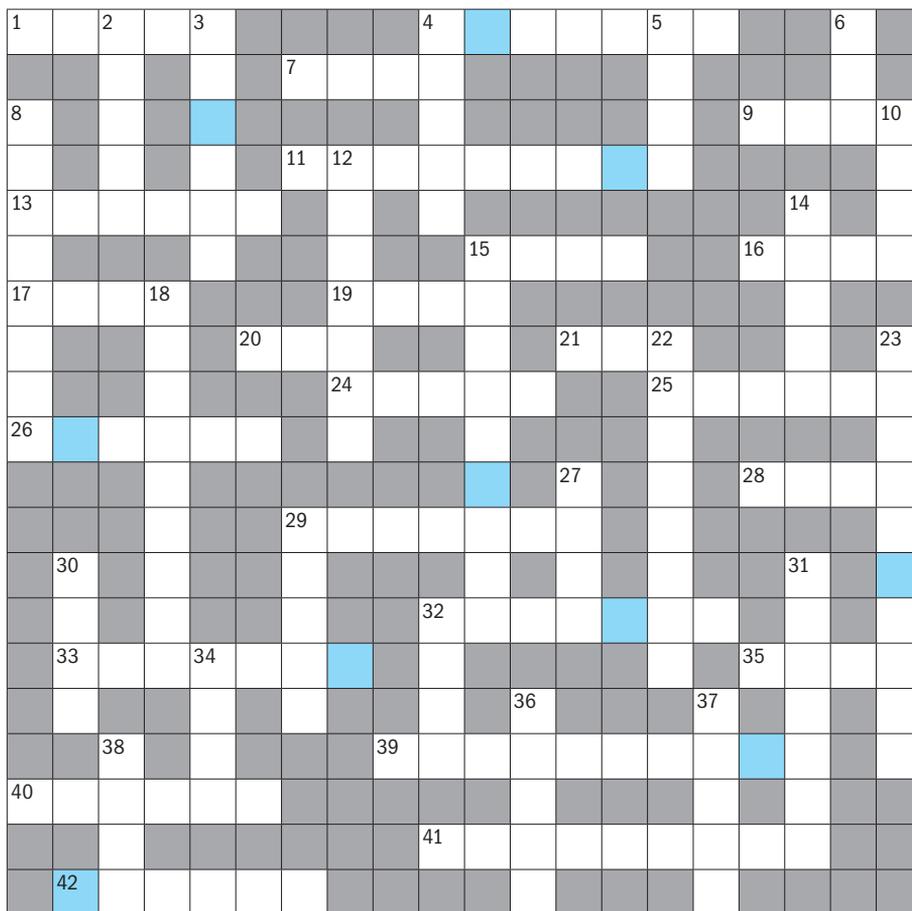
To keep your brain cells active over the festive period, we have put together this word puzzle based wholly on articles published in *Physics World* this year. We have two copies of *Astronomy Photographer of the Year: Collection 5* to give away as prizes. For terms and conditions and how to enter, see page 2

ACROSS

- 1. Warbling waveform of two black holes becoming one (5)
- 4. Antimatter experiment at CERN (7)
- 7. Algorithm implemented on an ion-trap quantum computer (4)
- 9. Organic matter embedded with CNTs to form a detector (4)
- 11. When the 2nd gravitational-wave signal was received by LIGO (6,3)
- 13. Part of a fish used to fabricate a piezoelectric generator (6)
- 15. Distant red lander crash site (4)
- 16. Weighing scale that balances electrical and mechanical power (4)
- 17. Go in circles around quantum gravity (4)
- 19. Galactic stellar-census mission (4)
- 20. See 24 across.
- 21. Light generator, sounds metallic (3)
- 24 and 20 across. Sacred dormant Polynesian volcano, topped with 13 eyes on the sky (5,3)
- 25. Indian gravitational-wave collaboration (6)
- 26. Abode of “cool” silver ant that is heat-resistant (6)
- 28. Energetic oscillation (4)
- 29. Is it a dark matter candidate? Is it an answer to the baryon asymmetry? It’s a ___ “little neutral one” (7)
- 32. Crystallography was done using this particle, for drug discovery (7)
- 33. “Big daddy” atoms, with large excited electron-clouds (7)
- 35. Fundamental biological unit; fuel store (4)
- 39. Four particles for Muster Mark! (10)
- 40 and 27 down. Dutch-American astronomer’s waistband (6,4)
- 41. Foodstuff that can be electrocuted into having a lower fat content (9)
- 42. Italian island near which the KM3NeT neutrino sea-scope will be built (6)

DOWN

- 2. Nation with Mars space craft on bank note (5)
- 3 and 32 down. Ninth rock from Sol? (6,4)
- 4. 2016 is the 25th anniversary of this preprint repository (5)
- 5. All the particle physicists sing “Wake up little ___” (4)
- 6. Jamaican beats; radio array (3)
- 8. New high-res microscope glass with large field of view (8)
- 10. “Speedy” spherical alien and dark-matter hunter in China (4)



- 12. Folded metamaterial, Japanese art (7)
- 14. The ___ effect: named after famous physicist around whom lab equipment regularly failed (5)
- 15. Irresistible mineral, contains a geomagnetic imprint (9)
- 18. Light that disrupts a bird’s magnetic compass (9)
- 22. LHC’s “bumpy” excess no more (8)
- 23. See 30 down
- 27. See 40 across
- 29. Toothy pelagic predator navigating with high-proton jelly (5)
- 30 and 23 down. Scottish polymath, RBS approved (4,10)
- 31. “Ghostly” pattern (7)
- 32. See 3 down
- 34. Colour of light from “first generation” supernovae (4)
- 36. Giant gas laser at UK military research centre (5)
- 37. Panama divider (5)
- 38. Illuminated WiFi network (4)

BONUS PUZZLE

The letters in the blue squares can be rearranged to spell out a hypothetical stellar object that could mimic black-hole gravitational-wave signals (10).

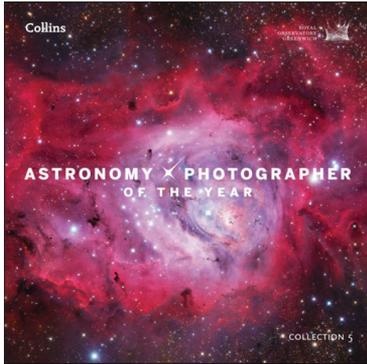
Answer: _____

COMPETITION

For the fifth year in a row, the Royal Observatory Greenwich has published a beautiful hardback book showcasing the winners of the Astronomy Photographer of the Year competition. This year, its publisher Collins Astronomy has kindly offered us two copies to give away to readers. You just need to complete this festive puzzle to be in with a chance of winning. For terms and conditions and how to enter, see p2.

For our review of *Astronomy Photographer of the Year: Collection 5*, see Christmas Books, December 2016.

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To win one of two copies of the book *Astronomy Photographer of the Year: Collection 5*, published November 2016 by Collins Astronomy, you can enter our festive competition on p1.

To enter the competition, complete the puzzle on p1 and send it to us by **16 January 2017**.

Please include your full name and contact details with your entry.

Send your completed puzzle by post to:
Physics World
Temple Circus
Temple Way
Bristol
BS1 6HG
UK

Alternatively, you can scan your completed puzzle and e-mail it to pwld@iop.org.

Terms and conditions apply.

Terms and conditions

These terms and conditions apply to all entries to the Physics World Crossword Competition – December 2016, however submitted. Promoter is IOP Publishing Limited (“IOP”) of Temple Circus, Temple Way, Bristol, UK, BS1 6HG. No purchase necessary. All entries must be received by the closing date of 16 January 2017. The winners will be drawn at random from all the entrants who successfully complete the crossword. The draw will take place within 30 days of the closing date. If IOP cannot contact any winner within 90 days of the closing date, it shall have the right to declare their entry void and to draw a new winner. IOP’s decision is final and no correspondence will be entered into. Only one entry per person and entrants must be over 16 and have the right to enter. IOP can change

or withdraw these terms without notice and can refuse any entry. No entries allowed from IOP employees or anyone connected with the competition, including their immediate families. Only two prizes. As not all countries in the world accept the legality of competitions, it is the sole responsibility of each non United Kingdom based entrant to ensure that he or she is not breaching any laws of their country of residence by submitting an entry. IOP will not be held responsible for any entrant entering any competitions unlawfully. If in any doubt, the entrant should check with the relevant authorities in his or her country. Delivery costs paid by IOP but any other costs winner’s responsibility. IOP can use winner’s name, location and affiliation for promotion. Personal data will be processed in accordance with Data Protection Act 1998. Terms governed by English law.