



Scientists have developed the most potent magnetic field known in the cosmos.

Description

Perhaps you are unacquainted with the term 'magnetars', curious celestial entities that fall into the category of neutron stars. Magnetars have caught the attention of astronomers and physicists globally due to their remarkably potent magnetic fields, which are reported to be approximately a trillion times more forceful than our planet Earth's.

To elucidate the scale of their prodigious power, were one to venture just 1,000 km - the equivalent of 600 miles - closer to a magnetar than advisable, the outcome would be catastrophic. The formidable magnetic field would rend the electrons from your atoms, transmuting your corporeal form into an ethereal cloud of monatomic ions, comprised of distinctive atoms bereft of electrons, as observed by [EarthSky](#).

However, researchers have recently made a startling discovery. Pockets may exist here on our beloved Earth, where magnetic pulses occur with a strength that surpasses that of the seemingly indomitable magnetars, casting these cosmic behemoths into realms of relative ineffectiveness. You might be pondering how such a phenomenon could transpire. Unsurprisingly, the answer is an intricate one.

Our story commences at the Brookhaven National Laboratory, under the aegis of the United States Department of Energy. This tale revolves around the Relativistic Heavy Ion Collider (RHIC), an esoteric piece of advanced machinery operating in the lab's confines.



(Roger Stoutenburgh and Jen Abramowitz/Brookhaven National Laboratory)

Following vigorous collisions of various heavy ion nuclei within the behemoth particle accelerator, laboratory physicists unravelled manifestations of magnetic fields that shattered existing records.

By scrutinising the movements of an even more diminutive class of particles - quarks and gluons,

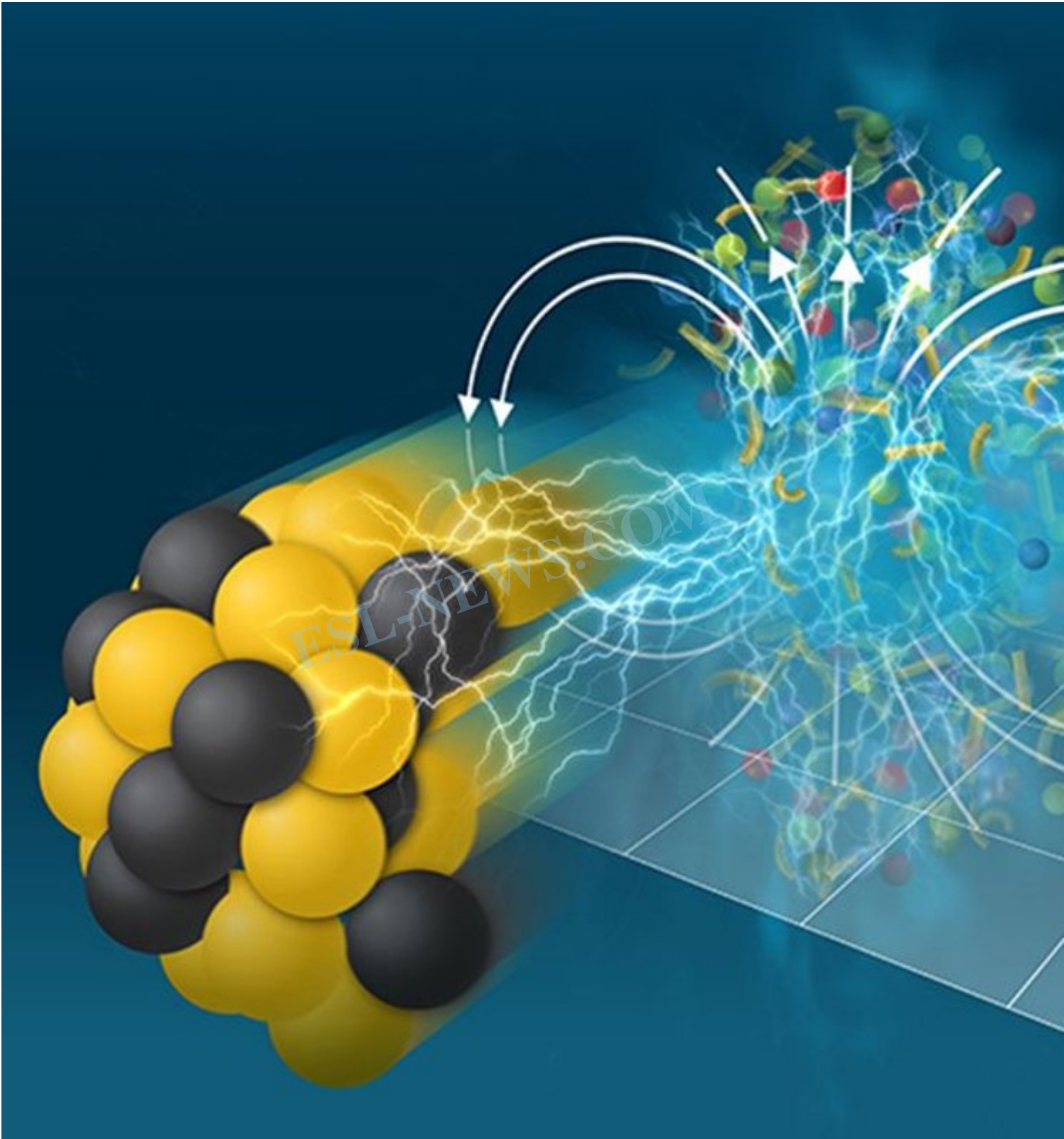


infinitesimal building blocks of all observable matter in the cosmos, researchers aspire to unlock new dimensions of understanding regarding the profound mechanisms governing atomic structures.

In this atomic microcosm preside antiquarks, the nemeses of quarks. Each type of quark has a corresponding antiquark, sharing the same mass, energy, and pure quantum characteristics, although with adverse charge and quantum numbers. The fleeting nature of the lives of quarks and antiquarks within atomic structures poses a significant challenge. The more we comprehend their intrinsic behaviour and interactions, the more knowledge we amass about the intimate structure of matter, feeding our understanding of the cosmos.

To accurately chart the activity of these fundamental particles, a robust magnetic field is indispensable. The scholars at Brookhaven utilised the RHIC to generate off-centre collisions of heavy atomic nuclei - in this specific instance, gold. This impactful collision generated a powerful magnetic force, inducing an electrical current within the liberated quarks and gluons.

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(Tiffany Bowman and Jen Abramowitz/Brookhaven National Laboratory)

Diyu Shen, a distinguished physicist from China's Fudan University, confirmed that this is the inaugural measurement of how the magnetic field interacts with the quark-gluon plasma (QGP). The magnitude of the fields was so immense that it was challenging to observe and quantify. However, the research team was able to monitor the collective movements of charged particles, discern charge-dependent deflections, and



prove Faraday Induction's occurrence. The acquired data will help them further explore the intricate interactions of quarks and gluons, providing a deeper understanding of the universe's composition.

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Vocabulary List:

1. **celestial** // (adjective): Relating to the sky or outer space.
2. **astronomers** // (noun): People who study celestial bodies and phenomena.
3. **physicists** // (noun): Scientists who study matterenergyand the interactions between them.
4. **potent** // (adjective): Having great powerinfluenceor effect.
5. **trillion** // (noun): A million million equivalent to a thousand billion.
6. **catastrophic** // (adjective): Involving or causing great damage or suffering.

Vocabulary quizzes

Multiple Choice (Select the Correct answer for each question.)



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1. What term describes objects related to outer space or the heavens?
Option: Astronomical
Option: Supernatural
Option: Terrestrial
Option: Molecular
 2. Which term describes something involving or causing great damage or suffering?
Option: Miraculous
Option: Benevolent
Option: Catastrophic
Option: Fortuitous
 3. Which term describes strong desires to achieve something or reach a goal?
Option: Indifference
Option: Resignation
Option: Contentment
Option: Ambitions
 4. What term refers to the capability of working successfully or being effective?
Option: Imperative
Option: Unreliable
Option: Viability
Option: Incapacitated
 5. What term means involving something as a necessary part or consequence?
Option: Omitting
Option: Disregarding
Option: Neglecting
Option: Entailing
 6. Which term means attractive or tempting especially in a provocative way?
Option: Repulsive
Option: Gorgeous
Option: Intriguing
Option: Enticing
 7. Which term describes something likely to develop positively or successfully?
Option: Diminishing
Option: Doubtful
Option: Misguided
Option: Promising



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8. Which term means strong and healthy; vigorous?
Option: Fragile
Option: Robust
Option: Delicate
Option: Frail
9. What term refers to the extreme scale seriousness or extent of something perceived as bad or morally wrong?
Option: Smallness
Option: Triviality
Option: Enormity
Option: Moderation
10. Which term describes cautiousness and wisdom in handling practical matters?
Option: Foolishness
Option: Rashness
Option: Impulsiveness
Option: Prudence

Gap-Fill (Fill in the blanks with the correct word from the vocabulary list.)

11. The caterpillar was _____ into a butterfly.
12. The sunrise _____ the sky with beautiful hues of orange and pink.
13. The treasure was hidden deep within the _____ of the ancient ruins.
14. The young entrepreneur had a _____ future ahead in the tech industry.
15. The new _____ exhibition at the museum attracted visitors from far and wide.
16. His contract was _____ prematurely due to breach of company policies.
17. The company was _____ in the competitive market unable to find a niche.
18. Students need to _____ in the course before the semester begins.
19. The medicine had a _____ effect on alleviating the patient's pain.
20. Launching a successful business will _____ a significant amount of hard work.



Matching Sentences (Match each definition to the correct word from the vocabulary list.)

21. Some ancient cultures believed that the movements of the stars and planets were guided by forces.
22. study the universe its celestial bodies and the phenomena that occur in space.
23. focus on understanding the fundamental principles that govern matter energy space and time.
24. The national debt reached over one dollars a staggering amount.
25. The novel had an plot that captivated readers until the very end.
26. The artist was for her innovative sculptures that challenged traditional art forms.
27. is the scientific study of prehistoric life through the examination of fossils.
28. As a wine she could discern the subtlest flavors and aromas in different vintages.
29. The tsunami caused damage to the coastal town leaving devastation in its wake.
30. The of the issue became clear as more people voiced their concerns.

Answer

Multiple Choice: 1. Astronomical 2. Catastrophic 3. Ambitions 4. Viability 5. Entailing 6. Enticing 7. Promising 8. Robust 9. Enormity 10. Prudence

Gap-Fill: 11. metamorphosing 12. suffused 13. recesses 14. promising 15. museographical 16. terminated 17. floundering 18. enrol 19. potent 20. entail

Matching sentence: 1. celestial 2. astronomers 3. physicists 4. trillion 5. enthralling 6. renowned 7. paleontology 8. connoisseur 9. catastrophic 10. salience

CATEGORY

- 1. Sci/Tech - LEVEL6

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