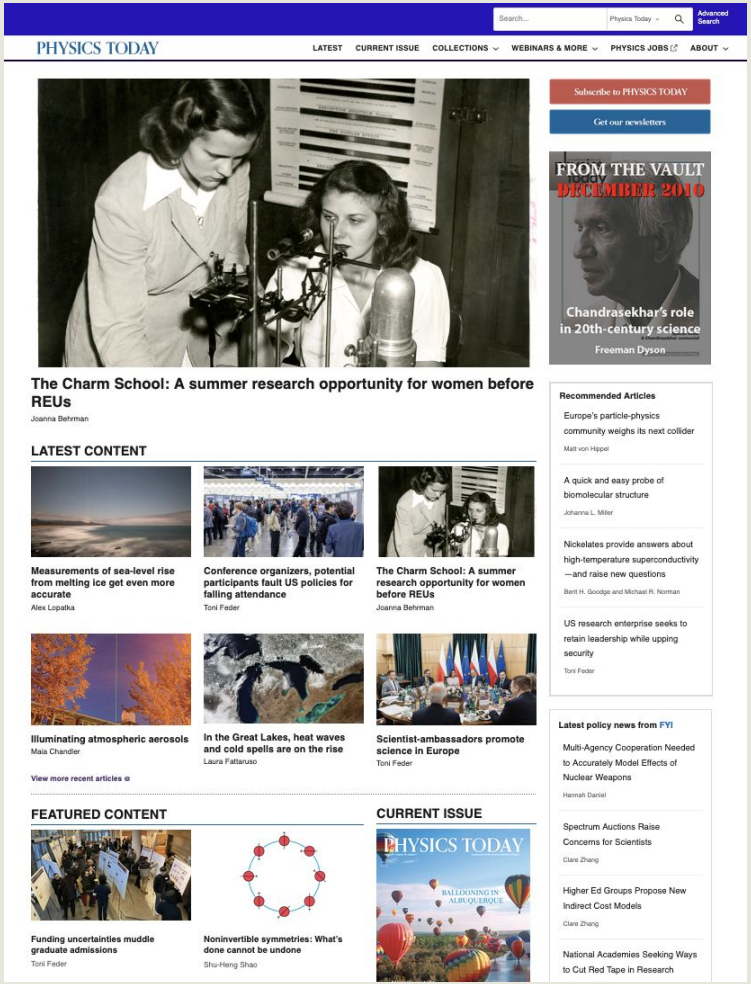
PHYSICS TODAY

WHY DO WE WRITE? HOW DO WE WRITE? WHAT DO WE WRITE?

JULY 2025

MAIA CHANDLER



PHYSICS TODAY

5 STEPS TO AN ARTICLE

(DISCLAIMER) THIS IS INCREDIBLY SIMPLIFIED

1: IDENTIFY

Physics for the unwary student

by Pippa Goldschmidt

1. Imagine that you are trying to balance on the surface of an expanding balloon. List all the different ways in which this resembles reality.
2. Thousands of sub-atomic particles stream through you night and day. Does this account for those peculiar flashes of light you sometimes see?
3. You are trapped in a lift which is plummeting to the ground. Describe what you feel.
4. You are in a spaceship travelling towards a black hole. As you pass the event horizon and become cut off from the rest of the Universe, what do you observe?
5. What happens if you stop believing in gravity? Will you slide off the Earth?
6. What happens if you stop believing?

IPhO
International Physics Olympiad
FRANCE 2025

2: RESEARCH

nature astronomy

Article

https://doi.org/10.1038/s41550-025-02589-5

Calcium in a supernova remnant as a fingerprint of a sub-Chandrasekhar-mass explosion

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Check for updates

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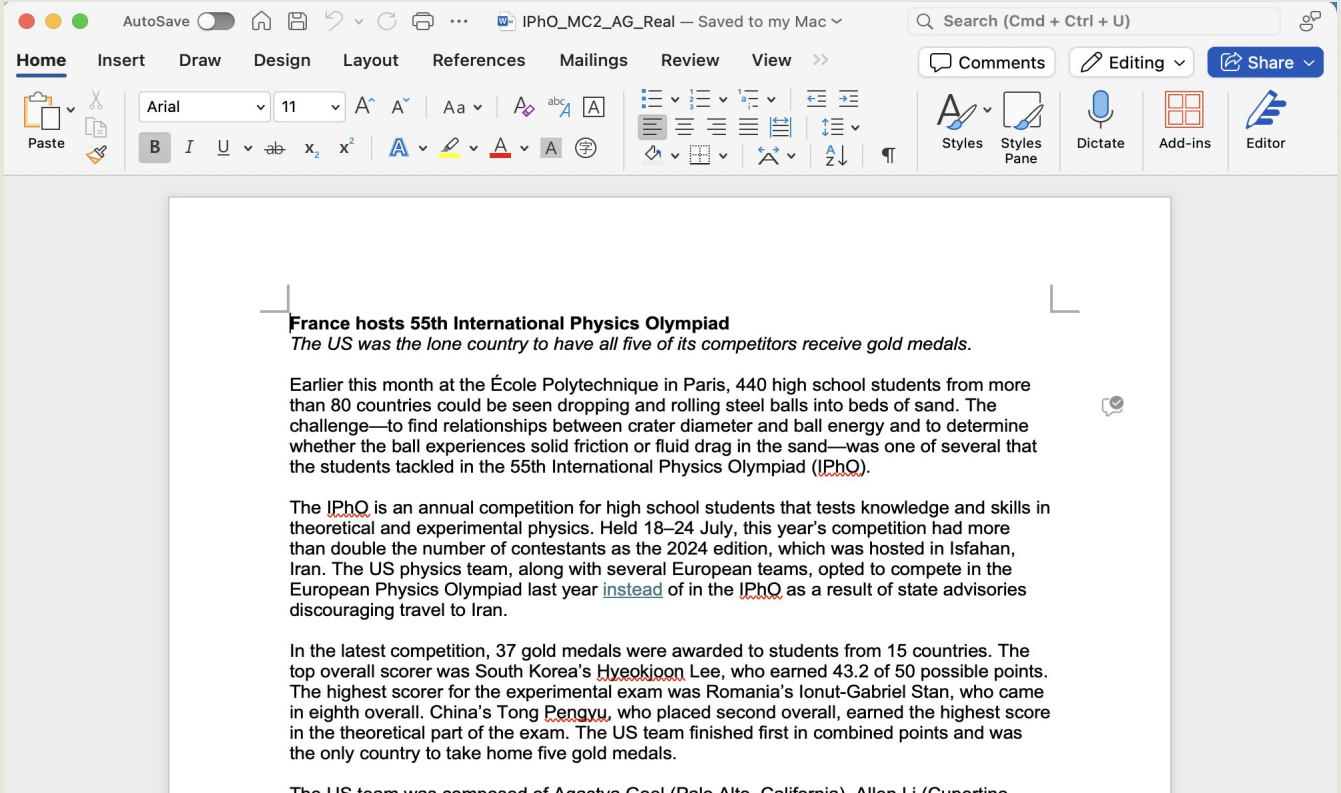
3: WRITE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Search (Cmd + Ctrl + U)
Home
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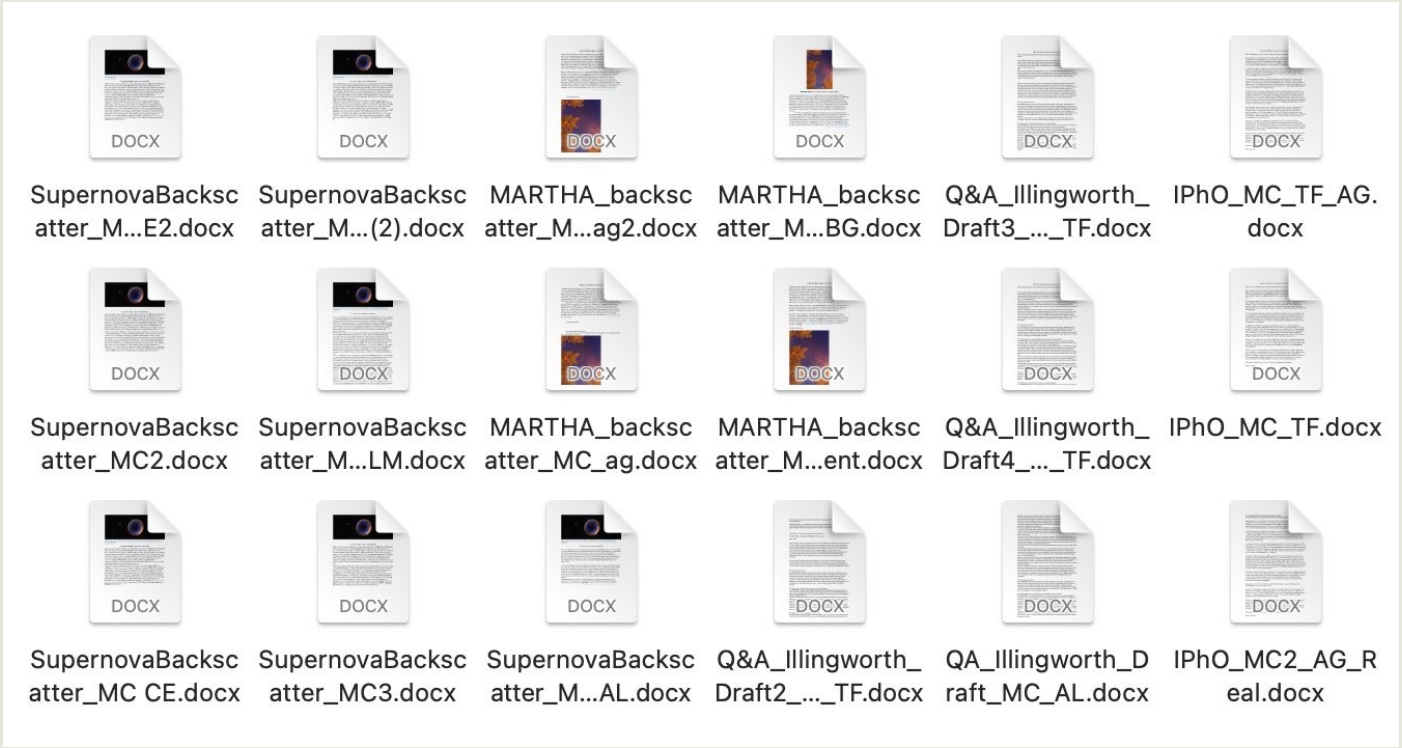
Editor
France hosts 55th International Physics Olympiad
The US was the lone country to have all five of its competitors receive gold medals.
Earlier this month at the École Polytechnique in Paris, 440 high school students from more than 80 countries could be seen dropping and rolling steel balls into beds of sand. The challenge—to find relationships between crater diameter and ball energy and to determine whether the ball experiences solid friction or fluid drag in the sand—was one of several that the students tackled in the 55th International Physics Olympiad (IPhO).
The IPhO is an annual competition for high school students that tests knowledge and skills in theoretical and experimental physics. Held 18–24 July, this year's competition had more than double the number of contestants as the 2024 edition, which was hosted in Isfahan, Iran. The US physics team, along with several European teams, opted to compete in the European Physics Olympiad last year instead of in the IPhO as a result of state advisories discouraging travel to Iran.
In the latest competition, 37 gold medals were awarded to students from 15 countries. The top overall scorer was South Korea's Hyeokjoon Lee, who earned 43.2 of 50 possible points. The highest scorer for the experimental exam was Romania's Ionut-Gabriel Stan, who came in eighth overall. China's Tong Pengyu, who placed second overall, earned the highest score in the theoretical part of the exam. The US team finished first in combined points and was the only country to take home five gold medals.

4: REVISE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LESSONS LEARNT?

- READ!!
- HOW DO WE DEFINE A STORY?
  - IF YOU CUT SOMETHING OUT, DOES THE STORY STILL HOLD?
- GRAMMAR
- REFINING WRITING PROCESS
  - TRANSITIONS
  - MOMENTUM
  - RHYTHM
  - LANGUAGE
  - IMAGES
- BEHIND THE SCENES WORK

STEP 5: PUBLISH

Fingerprinting a supernova explosion FREE

23 July 2025

Maia Chandler

DOI: https://doi.org/10.1063/pt.mxgt.hble

Type Ia supernovae, such as the young supernova remnant (SNR) 0509-67.5 shown here, are integral to understanding how the universe expands. Because of their predictable luminosity, they're called standard candles, and astronomers use them to measure the distances of astronomical objects from Earth. The uniform luminosity was previously thought to be because white dwarfs explode at a standard 1.44 solar masses, the Chandrasekhar mass limit. Now it is hypothesized that white dwarfs become supernovae at masses significantly below that limit. SNR 0509-67.5, as captured by the European Southern Observatory's Very Large Telescope, detonated at a low mass. Studying it can help researchers understand how type Ia supernovae occur.

The artificially enhanced colors in the image reflect the remnant's chemical composition: calcium in blue and hydrogen in orange. SNR 0509-67.5 has an unusual structure, with two concentric calcium rings in a hydrogen shell that marks the supernova's boundary. The structure is consistent with the previously theorized double-detonation mechanism, in which the supernova explodes twice. For double detonation to occur below the Chandrasekhar mass limit, excess helium around SNR 0509-67.5 had to condense into a thin, unstable blanket that ignited an initial explosion. The resulting shock wave traveled inward to the white dwarf's core and triggered a second detonation, which caused stellar material to plow into the surrounding interstellar gas. (P. Das et al., *Nat. Astron.*, 2025, doi:10.1038/s41550-025-02589-5; image by ESO/P. Das et al., background stars [*Hubble*] from K. Noll et al.)

MORE TO COME:

POETS + IPhO

THANK YOU TO:

TONI FEDER

ANDREW GRANT

ALEX LOPATKA

JOHANNA MILLER

RICH FITZGERALD

JENESSA DUNCOMBE

MIKAYLA CLEAVER

RIANNA EHRENREICH

KAYLA STEPHENS

LIDAR

SUPERNOVA

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SPS AIP