

► Freese, a theoretical astroparticle physicist at the University of Michigan in Ann Arbor, who was part of the team that first proposed looking for such a signal, in 1986 (A. K. Drukier *et al. Phys. Rev. D* **33**, 3495–3508; 1986).

When DAMA first announced that it had seen such a fluctuation in 1997, soon after an early version of the experiment was turned on, the physics community was sceptical. Critics doubted that this effect was a genuine sign of dark matter. Instead, they said, terrestrial sources or quirks in the apparatus might be mimicking a real signal. There was also a possibility that the blip would vanish after parts of the detector were replaced with newer technology. But that didn't happen. "The modulation is still there, loud and clear," says Freese.

A number of increasingly sophisticated experiments that should also see dark matter — although using different techniques — have so far found none. But the DAMA team has continued to see a fluctuation. The group confirmed that it had seen the signal in 2013 (R. Bernabei *et al. Eur. Phys. J. C* **73**, 2648; 2013), with a previous incarnation of the experiment. The latest findings from DAMA come as other experiments attempt for the first time to corroborate or disprove the claim using the same type of sodium iodide crystal as in DAMA.

Leading that pack is COSINE-100, a US and South Korean experiment at the Yangyang underground laboratory in South Korea. Hyunsu Lee, a physicist at the Institute for Basic Science in Daejeon, says that had DAMA's signal disappeared in the new data, it would have dampened motivation for carrying out further sodium iodide experiments.

"For us, these results are very encouraging," says Susana Cebrian, a physicist at the University of Zaragoza in Spain who works on



The DAMA experiment in Italy is hunting for signs of dark matter.

another replication attempt, called ANAIS, in the Canfranc Underground Laboratory in the Pyrenees.

UNEXPECTED DEVIATION

But DAMA's latest results have a twist. The upgrade has made the detector sensitive to lower-energy collisions — signals from slower-moving particles. For typical dark-matter models, the timing of the fluctuations, as seen from Earth, should reverse below certain energies: "It should peak in December and be at a minimum in June," says Freese. The latest results don't show that.

The deviation "is refreshing, and food for thought," says Juan Collar, an experimental physicist at the University of Chicago in Illinois who works on dark-matter detection.

But many physicists still express scepticism.

Dan Hooper, a physicist at the Fermi National Accelerator Laboratory in Batavia, Illinois, tweeted on 26 March: "I cannot come up with a viable model that can produce this signal."

Freese, who isn't part of the DAMA collaboration, is more sanguine. She says that the data at low energies are still tentative, and could yet be compatible with a flip.

"It is more urgent than ever that an independent experiment based on the same technique, like ANAIS, could reproduce the effect," Cebrian says. Other experiments are planned in Australia and Japan.

Although DAMA's latest upgrades removed some potential concerns that the effect might have been generated inside the detector, Collar says: "The mystery, however, remains of why their result is incompatible with just about every other finding in this field." ■

S. SCHIAVON/LNGS-INFN

POLICY

Copyright reforms draw fire from scientists

Planned changes to EU regulations prompt concerns that they will impede open science.

BY QUIRIN SCHIERMEIER

An influential committee of the European Parliament is due to vote this month on changes to copyright regulations, but the latest drafts of the rules have triggered a wave of criticism from open-science advocates. They say that the proposals will stifle research and scholarly communication.

Intellectual-property experts agree that

existing EU copyright rules need an overhaul for the digital age, and a proposal first circulated by the European Commission in 2016 had this goal in mind. But critics worry that some provisions in more-recent proposals for the law — known as the directive on copyright in the digital single market — conflict with Europe's principles of open science and freedom of expression.

"Copyright law must not hamper open science," says Vanessa Proudman, European

director of the Scholarly Publishing and Academic Resources Coalition (SPARC), a science-advocacy group in Apeldoorn, the Netherlands. "The EU has made significant headway towards open access of research funded by European citizens. The proposed new rules would clearly impede further progress, threatening the visibility of Europe's research," she says.

Concerns focus on a provision that would let publishers claim royalties for the use of snippets

of information, such as tables or headlines. This was included with the aim of enabling news publishers to secure revenue from social-media platforms such as Facebook and Google. But a proposal added by a European-parliament committee would mean that the provision also applies to academic publications.

Many scholarly publishers, including the International Association for Scientific, Technical and Medical Publishers (STM), based in Oxford, UK, support this amendment. But open-research advocates say that facts and information in a scientific article must remain free from copyright. “We really don’t want further paywalls on top of any research materials libraries have paid for already,” says Maria Reh binder, a copyright specialist in Aalto, Finland, with the Association of European Research Libraries.

FEE CONTROVERSY

Some researchers express concern that the proposed rule might even force scientists to pay fees to publishers for references they include in their own publications. But STM “cannot envisage any situation where students and researchers would need to pay fees” for citations, says Matt McKay, a spokesperson for STM.

The EU copyright law, as written, would also compel research repositories to prevent uploads

of copyrighted papers and other content. Currently, the onus is on academic publishers to issue take-down notices for papers illegally posted to repositories.

The scholarly social network ResearchGate, for example, has in recent months disabled public access to more than 1.7 million papers on its site, in compliance with take-down messages by publishers. This process of removing

“We really don’t want further paywalls on top of any research materials libraries have paid for already.”

articles upon request, says Proudman, works well and effectively for institutional repositories. Forcing all existing non-profit educational and research-data services, including more than 1,000 university repositories, to seek copyright licences and install upload filters would overburden most institutions, she says. “The proposed level of surveillance would put science repositories in the same boat as Facebook or YouTube,” she says, by requiring them to scan submissions for possible copyright violations.

The proposed rules aren’t all bad news for science, says Marie Timmermann, who is in charge of EU legislation and regulatory affairs at Science Europe, an association of national research-funding agencies in Brussels.

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Text-mining — in which researchers use computer programs to extract data automatically from large numbers of texts — is exempted from the copyright law, when carried out in the public interest. Scientists at public research organizations would be allowed to harvest facts and data from all sources they have legal access to read.

However, this exemption does not extend to companies — a possible problem for EU-funded research projects, which increasingly include commercial partners, Timmermann notes.

The European Parliament legal committee’s vote on the law, scheduled for 23–24 April, will be a crucial test of whether lawmakers are listening to scientists’ concerns. The precise version the committee will consider has not yet been finalized and circulated, and the final law will also need to be approved by the entire parliament and by EU member states before it can come into effect, due for next year. “For the sake of European research, we hope the worst flaws will yet be deleted,” Timmerman says. ■

CORRECTION

The Editorial ‘AI diagnostics need attention’ (*Nature* **555**, 285; 2018) gave an inaccurate description of the methods in a 2017 study. The model detected breast cancer in whole slide images, not mammograms.

CLARIFICATION

The News story 'Copyright reforms draw fire from scientists' (*Nature* **556**, 14–15; 2018) should have made it clear that when Vanessa Proudman talked of “that process” she was referring to how institutional repositories deal with copyright violations.