

# NEWS IN FOCUS

**POLITICS** Brazilian scientists strive to turn politicians into allies **p.609**

**ENVIRONMENT** Researchers are setting a forest on fire and studying it with drones **p.610**

**PHYSICS** Google revives controversial cold-fusion experiments **p.611**



**BIODIVERSITY** A biologist tries fresh approaches to revamp conservation **p.618**

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The Romanian arm of the Extreme Light Infrastructure is designed to push the boundaries of nuclear physics.

PHYSICS

## Disputes plague world's largest laser laboratory

The €875-million Extreme Light Infrastructure is being built across Eastern Europe.

BY ALISON ABBOTT

When the European Union approved an ambitious €875-million (US\$979-million) project to build the world's largest scientific laser facility, it was conducting its own pioneering experiment. Three former communist countries would host the lasers, in a bid to boost science in the region. And, in an economic first, the research facility would be paid for with EU structural funds, which are typically used to build basic

infrastructure in poorer EU states.

A decade after it was approved, the Extreme Light Infrastructure (ELI) — a network of high-powered laser laboratories in Hungary, Romania and the Czech Republic — is now nearly ready to open to researchers around the world. But *Nature* has learnt that disputes in two of the host countries are rocking the project in its final stages, and threatening its reputation.

The Romanian lab, designed to push the boundaries of nuclear physics, is locked in a legal tussle that is preventing the completion of

its  $\gamma$ -source — a beam of high-intensity  $\gamma$ -rays that would allow detailed study of nuclear structure. A separate dispute in Hungary has led to the resignation of three members of the lab's science advisory committee.

Documents seen by *Nature* reveal that high-level efforts by the European Commission to cool tensions in Romania and keep the project on track have so far failed. Letters of concern written by nations involved in ELI's development show that several countries hoping to join ELI, which will eventually be governed ▶

► by an international CERN-like body, are reconsidering whether they will sign up.

“We hope that Romania will be able to catch up quickly and complete its facility in full, as it was originally proposed,” says Michael Prouza, head of the Czech laboratory.

## NUMBERS PROBLEM

ELI is designed as a system of powerful lasers and particle beams that would enable frontier research in physics, materials science, biomedicine and even archaeology. Each facility hosts a different kind of laser (see ‘Guiding lights’).

The ELI Nuclear Physics (ELI-NP) facility near Bucharest has two main components. Its laser is ready for operation and can deliver the world’s most intense beams, but a stand-off between the lab’s leaders and the developers of its  $\gamma$ -source has stalled its completion.

The dispute has led to Romania being shut out of ELI’s next crucial phase — the creation of the legal entity that will oversee all three sites. The Czech and Hungarian partners, whose facilities are close to completion, want to push forward with the creation of the governing body without Romania so that they can open to the scientific community next year. But that poses a problem, because such an organization requires at least three nations.

Italy — which alongside France, Germany and the United Kingdom is involved in coordinating ELI’s development — says that it will step in to enable the creation of the organization, known as a European Research Infrastructure Consortium (ERIC), this year.

Allen Weeks, ELI’s director-general, says, “We believe our Romanian colleagues will be able to resolve the issues and they will have the possibility to join the ERIC at that time.”

But Italy’s involvement does not solve the Romanian site’s  $\gamma$ -source problem. In 2014, an international consortium called EuroGammaS won the contract to build the system. At issue is the building that will house the  $\gamma$ -source, which was purpose-built at the National Institute for Physics and Nuclear Engineering Horia Hulubei (IFIN-HH) in Bucharest. EuroGammaS says that the building needs to be altered to meet safety regulations and the requirements of the sensitive machine, but that IFIN-HH has not authorized them to make the changes, despite EuroGammaS offering to pay for them.

But the Romanian facility’s director, Nicolae-Victor Zamfir, who is also head of IFIN-HH, says that there are no problems with the building. He adds that the contract

includes a description of the building, and that deviation from this description is legally difficult. Zamfir cancelled the contract with EuroGammaS in November 2018 and says he will create a new tender for the contract to replace EuroGammaS.

EuroGammaS took IFIN-HH to court in Romania last October, hoping to force the institute to allow the source’s installation. When Zamfir cancelled the contract, EuroGammaS asked the court to rule against the termination.

The dispute prompted the European Commission to try to mediate earlier this year. In January, the EU’s regional policy commissioner Corina Crețu and research commissioner Carlos Moedas reached an agreement with Romanian, French and Italian representatives that the contract termination should be reversed, that

the IFIN-HH should change the building as required, and that EuroGammaS should suspend legal activities until mediation is complete.

But Romania has not yet signed the agreement. And although the European Commission and the French and Italian research ministers wrote in April to the Romanian research minister, Nicolae Hurduc, calling on him to respond, they say their letters have gone unanswered. (Hurduc did not respond to *Nature*’s request for comment.)

A November letter from the Czech education minister to Hurduc says that at ELI’s general assembly in October, France, Italy, Germany and the United Kingdom expressed “serious concerns” about the dispute, and that the stand-off has prompted these nations to reconsider whether they will join the ELI-ERIC in the near future.

## HUNGARIAN SITE

In Hungary, a tussle between Prime Minister Viktor Orbán’s government and the international science advisory committee of the ELI Attosecond Light Pulse Source (ELI-ALPS) prompted three scientists to resign from the panel in March. Physicists Reinhard Kienberger and Gerhard Paulus in Germany and Gyula Faigel in Hungary quit in protest against a government decree to invest 18.5 billion forints (US\$63 million) in two national science projects that will “take advantage of the ELI-ALPS laser research centre”.

The scientists complain that the science ministry failed to consult them on the plans, and that the process to approve the projects — which they say will take up substantial resources at ELI-ALPS — did not conform with accepted standards for review. They say that the physicists coordinating the projects — Ferenc Krausz, at the Ludwig Maximilian University in Munich, and Gérard Mourou at the Ecole Polytechnique in Paris — also advised the research ministry on the projects’ approval, which in their view poses a conflict of interest. In their resignation letter, seen by *Nature*, the scientists say that the evaluation process poses “immediate risks to the facility and its reputation”.

The Hungarian research minister László Palkovics told *Nature* that the ministry didn’t need to consult the ELI-APS committee because the projects are separate national initiatives that aren’t part of ELI.

Mourou, who shared last year’s Nobel Prize in Physics, told *Nature* that he had not been involved in the decision-making processes for the 570-million-forint project he is coordinating, which will try to treat nuclear waste with lasers. He says he considers the ELI-ALPS laser perfectly suited to testing his theory.

Krausz — who is involved in a 17.9-billion-forint project to develop laser-based techniques to detect cancer — also says that he was not involved in the decision-making process. He says that because he proposed the project, that would not have been in line with international standards. ■

