

EUROPEAN UNION

Political Crisis Puts Europe's Research Ambitions in Doubt

The marathon summit that failed and plunged the European Union into disarray last week also dealt a severe blow to aspirations for European science policy, unveiled just 2 months ago by the European Commission—most notably to its plan to double the E.U.'s science budget. Disappointed researchers say the fiasco shows that politicians are only paying lip service to the so-called Lisbon strategy, which aims to revamp Europe's economy through research, innovation, and economic reforms.

"What a nightmare," says French biologist Frédéric Sgard, vice president of Euroscience, an organization of European researchers that has lobbied for major new investments in science. The failure could spell the end of the plan, hailed by many scientists, for a European Research Council (ERC) to fund basic research. The 2-day meeting in Brussels, aimed at hashing out an E.U. budget for 2007–13, ended in bitter acrimony primarily because the United Kingdom refused to pay more into the E.U.'s coffers if negotiations on the union's agricultural subsidies weren't reopened—a condition unacceptable to France, the subsidies' main beneficiary. The stalemate deepened a crisis opened 3 weeks ago by the French and Dutch "no" votes on the proposed European Constitution.

In April, the European Commission had rolled out its proposal for Framework 7 (FP7), the most ambitious of the E.U.'s research programs yet. At €73 billion, the 7-year program would have more than doubled the E.U.'s annual expenditure on research and innovation. But disagreements about the broader budget clouded the plan's future from the start (*Science*, 15 April, p. 342). In an attempt to solve the looming crisis, Luxembourg, which currently holds the E.U. presidency, recently proposed growing the entire "competitiveness" budget—which includes research—at a

much slower pace, which would result in €43 billion or less for FP7.

The Luxembourg compromise failed last week, but few countries protested the cuts that it would have made in research and innovation, Sgard says, making it very unlikely they will reserve more money for science in any



No love lost. Britain's Tony Blair and France's Jacques Chirac disagreed bitterly at last week's summit meeting.

future agreement. What's more, with Britain assuming the rotating presidency for 6 months on 1 July, any compromise on member contributions and farm subsidies seems unlikely. That will, in turn, hamstringing the discussion about FP7 in the European Parliament, which has just started, says Giles Chichester, chair of the Committee on Industry, Research, and Energy: "It would be extremely difficult if we don't know how much money we're talking about. We're in uncharted territory here."

The European Commission doesn't have a plan B, says a spokesperson for Research Commissioner Janez Potočnik. Until an agreement is reached on a new budget, the commission will continue preparing for FP7 based on the original proposal, she says. Member states' unwillingness to pay for the ambitious science policy they say they support has been "a huge disappointment" for Potočnik, who had tried hard to rally leaders behind FP7, according to a source close to the commissioner.

Potočnik's predecessor Philippe Busquin, the architect of the commission's current science policy, is equally dismayed. Busquin, now a member of the European Parliament, calls the Luxembourg plan "unacceptable"—all the more so because it would leave agricultural subsidies almost intact. "That's a budget of the past instead of the future," Busquin ▶

CONDENSED MATTER PHYSICS

Tiny Whirlpools Prove Atoms Flow Freely

Most researchers would rather not poke holes in their own experiments, but a team of physicists is happy to have done just that. Stirring a cloud of ultracold atoms, the physicists produced an array of tiny whirlpools that pierced the cloud and proved that the atoms in it had formed a "superfluid," a strange quantum-mechanical soup that flows without any resistance and refuses to rotate. The observation confirms that atoms can join in pairs and behave much like the free-flowing electrons in a superconductor, an effect that physicists have been racing to witness (*Science*, 8 August 2003, p. 750).

"It's a fantastic experiment, really heroic," says Deborah Jin, a physicist at JILA, a laboratory run by the National Institute of Standards and Technology and the University of Colorado, Boulder. Last year, Jin and her team showed that atoms in a gas could pair

like the electrons in a superconductor (*Science*, 6 February 2004, p. 741), but experimenters had not proved that the paired atoms actually flowed without resistance. The new results provide "conclusive evidence for superfluidity," Jin says.

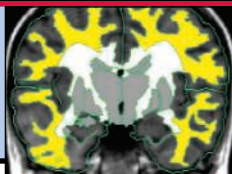
To generate the vortices, Martin Zwierlein, Wolfgang Ketterle, and colleagues at the Massachusetts Institute of Technology in Cambridge first used laser beams and magnetic fields to chill atoms of the isotope lithium-6 to within billionths of a degree of absolute zero. The atoms hovered in a vacuum chamber, trapped in a laser beam, and the researchers applied a magnetic field to make them interact. Tuning the strength of the field, the physicists coaxed the atoms to pair to form a "Fermi condensate." The subtle pairing occurs even though the atoms cannot bind to form molecules.

The researchers then tried to rotate the ▶

CREDIT: THIERRY ROGER/REUTERS

1856

Missing connections in autism



1858

The rocky road to personal medicines



1862

What role do exosomes play?



says. “This way, Europe will stagnate.”

Experts can only speculate about what might be sacrificed in a science budget that falls far short of the commission’s €73 billion proposal. One “prime target” would be the European Research Council, a new body to fund basic, investigator-driven research in a Europe-wide competition, Chichester predicts. “It’s always easier to cut something if you haven’t started it yet,” he says. But doing so would risk demoralizing and alienating the scientific community, which fought hard for the ERC; even major cuts in its proposed €1.7 billion annual budget would rob the council of its credibility, says Danish mathematician Mogens Flensted-Jensen, vice chair of the expert group that proposed the ERC in 2003.

Still, Helga Nowotny, chair of the European Research Advisory Board, does see some hope. The crisis will force politicians to rethink what European unification is all about; research, innovation, and education may well benefit if scientists keep pressing their case. What’s more, she notes that the United Kingdom is a strong proponent of shifting E.U. funds from farms to labs. Even if the British cannot foster a new agreement when they chair the union during their presidency, “they will certainly put research back on the map,” Nowotny says.

—MARTIN ENSERINK

INFECTIOUS DISEASES

Lapses Worry Bird Flu Experts

Global health experts trying to stave off a deadly pandemic of avian flu are alarmed by recent actions they see as counterproductive and even dangerous. Vietnam has been slow to report 10 new human cases, and farmers in China have reportedly been giving an antiviral drug to chickens that may have made the virus resistant to one of the few drugs available to fight human flu. If confirmed, China’s actions would be “very, very dangerous,” says Ilaria Capua of the Istituto Zooprofilattico Sperimentale della Venezia in Legnaro, Italy.

Vietnam has found another possible case of human-to-human transmission of the H5N1 virus among a total of 10 new cases it reported in a 1-week period—6 weeks or more after they were originally detected. The Ministry of Health officially notified the World Health Organization (WHO) of three new human H5N1 cases on 8 June, but the most recent of those had been detected on 26 April. On 14 June, Vietnam reported three more human cases



Drug habit. Chinese farmers routinely administered an antiviral drug to poultry, according to a news report.

that had turned up during the last 2 weeks of May. And on 17 June, the ministry reported four additional cases that had emerged between 1 and 17 June.

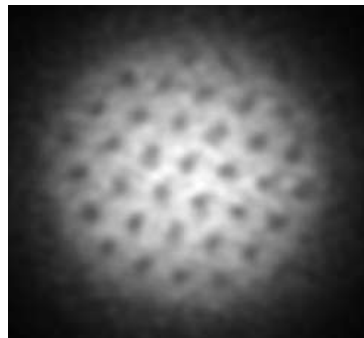
Peter Horby, an epidemiologist in WHO’s Hanoi office, says Vietnamese officials have quickly asked for help when there were obvious changes in the virus’s behavior, as when numerous mild cases of the disease emerged this spring. But he says it has been frustrating that these same officials have been less forthcoming in reporting the details of what they apparently see as more routine cases.

Some bird flu experts are equally alarmed by China’s veterinary use of the human antiviral drug amantadine, as reported in the 18 June *Washington Post*. According to the article, drugmakers and other sources in China admitted that the drug has been sold cheaply to farmers and given to poultry both as a treatment and a prophylactic since the late 1990s.

Most of the H5N1 strains isolated in the current outbreak in Asia are resistant to amantadine, but establishing a firm link with China’s use of the drug would require extensive data on where, when, and how much of the drug was used, notes Klaus Stöhr, WHO’s global influenza coordinator. K. Y. Yuen, a virologist at the University of Hong Kong, says the misuse of antivirals, such as amantadine, does raise the risk of fostering resistance. But he says the genetic mutation associated with amantadine resistance has been reported in viruses not exposed to the drug, which suggests that ▶

cloud by tickling it with another laser, much as one might set a golf ball spinning by brushing it with a feather, as they report this week in *Nature*. Had the lithium-6 been an ordinary fluid, the cloud would have rotated as a whole, just as water will rotate along with a slowly turning drinking glass. A superfluid resists rotation, however, because it is essentially a

quantum wave that can possess only quantized amounts of rotation. Turn its container fast enough, and a superfluid admits one quantum of rotation in the form of a tiny whirlpool, or “vortex.” Turn faster still, and the vortices proliferate and form a triangular array. That is what Zwierlein and Ketterle observed in



Smoking gun. Array of vortices proves that paired atoms form a superfluid.

the cloud of atoms, although not without a lot of work. “It was bloody difficult,” Ketterle says. “We were actually close to giving up.”

A Fermi condensate is a cousin of a Bose-Einstein condensate, a superfluid that forms when, instead of pairing, particles pile into a single quantum wave. By changing the magnetic field, physicists can now transform a

Fermi condensate of atoms into a Bose-Einstein condensate of loosely bound molecules and probe the connection between the two superfluids, says Henk Stoof, a theorist at Utrecht University in the Netherlands: “How you go from one limit to the other is very important.” The tunable superfluid could even mimic more exotic superfluids, such as the paired-up neutrons coursing through the hearts of neutron stars. —ADRIAN CHO

CREDITS (TOP TO BOTTOM): GREG BAKER/AP PHOTO; ANDRE SCHIROZEK/MIT