much as the sun orbits the inner pair every 327 days, Ransom and colleagues reported this week in *Nature*. "We think that there are not more than 100 of these [trios] in our galaxy," Ransom says. "They really are one-in-a-billion objects."

The distinctive new system opens the way for testing a concept behind Einstein's theory of gravity, or general relativity. Called the equivalence principle, it relates two different conceptions of mass: inertial mass, which quantifies how an object resists accelerating when it's pushed or pulled, and gravitational mass, which determines how much a gravitational field pulls on it.

The simplest version of the principle says inertial mass and gravitational mass are equal. It explains why ordinary objects like baseballs and bricks fall to Earth at the same rate regardless of their mass. The strong equivalence principle takes things an important step further. According to Einstein's famous equation, $E = mc^2$, energy equals mass. So energy in an object's own gravitational field can contribute to its mass. The strong equivalence principle states that even if one includes mass generated through such "self-gravitation," gravitational and inertial mass are still equal.

The strong equivalence principle holds in Einstein's general theory of relativity but not in most alternative theories, says Thibault Damour, a theoretical physicist at the Institute for Advanced Scientific Studies in Bures-sur-Yvette, France. So poking a pin in the principle would prove that general relativity is not the final word on gravity.

Researchers have tried to test the strong equivalence principle by scrutinizing how the moon and Earth orbit in the gravitational field of the sun and how pulsar–white dwarf pairs cavort in the gravitational field of the galaxy. But Earth's self-gravitation is tiny, and the galaxy's gravity is weak. So such tests have yielded a precision of only parts per thousand, Damour says.

The new pulsar system opens the way to a much more stringent test by combining the powerful self-gravitation of the pulsar with the strong gravitational field of the outer white dwarf. By tracking whether either the inner white dwarf or the pulsar falls faster toward the outer white dwarf, Ransom and colleagues should be able to test strong equivalence about 100 times as precisely as before, Damour says. If strong equivalence falters, Freire says, the result would mark "a complete revolution" in physics.

Ransom says his team should be able to test the principle within a year.

–ADRIAN CHO

NUCLEAR FUSION

Europe Focuses Fusion Research on Building a Working Power Reactor

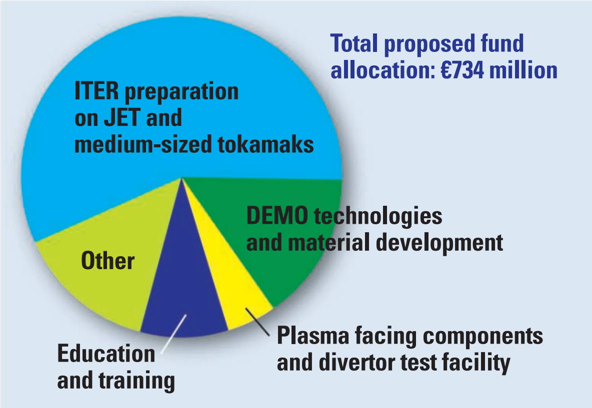
As the new year dawned, nuclear fusion researchers in the European Union woke to an entirely new funding system aimed at sharpening their focus on generating energy. Gone are the annual block grants to national fusion laboratories; now, teams must compete to participate in "work packages" supporting the international ITER reactor in France and preparing for a prototype power reactor before the middle of the century. "It's a substantial change in the way we work," says Francesco Romanelli, acting head of EUROfusion, a consortium of all of Europe's fusion labs that will manage the new program.

The change is the handiwork of the European Union's nuclear research arm, Euratom. It funds both ITER construction, shouldering 45% of the cost—a €6.6 billion share by the time the reactor is completed in 2020—and related fusion research in labs across the continent. That is the part of the budget that the new system redirects.

In the old system, in place since the 1950s, Euratom simply gave each of the national labs a lump of money every year equal to as much as 20% of the lab's budget and gently coordinated research. Euratom also funded the only common facility, the Joint European Torus (JET) reactor in Culham, U.K., through the European Fusion Development Agreement (EFDA).

In 2011, Euratom appointed a panel to recommend how to organize fusion research in the European Union's next 7-year financial period, starting in 2014. Headed by Albrecht Wagner, former head of the DESY particle physics lab in Germany, the panel recommended a more mission-oriented approach focusing on fusion energy. "If ITER is not a success, there is no need for future research," says Alain Bécoulet, head of France's Research Institute for Magnetic Fusion.

In 2012, Euratom tasked EFDA with drawing up a road map for refocusing Europe's fusion efforts. Published at the beginning of 2013, the road map called for the European Union to concentrate on finishing and operating ITER while also preparing for its successor, a power-producing prototype, dubbed DEMO. In response, Euratom announced that the annual grants would cease at the end of the year and that the fusion community must devise a 5-year program of research based on the aims of the road map.



On a mission. Europe's fusion research effort now has the goal of generating electricity before 2050.

Since then, the heads of the fusion labs have been working furiously to comply, and they finalized the work program last month. The program, which Euratom will spend the next 3 months evaluating, includes a campaign of experiments on JET to simulate ITER operation plus experiments at smaller reactors across Europe. There's money for technology R&D for ITER and DEMO, for training future fusion scientists, and for a neutron source to test materials in the sort of neutron bombardment they will experience in a working reactor. The program also hedges its bets by supporting work on stellarators, an alternative fusion technology that could play a role if ITER fizzles.

Bécoulet worries that the program focuses too much on the future—ITER operation and DEMO—and not on the immediate needs of ITER construction. "We're very upset with the proposal," he says, adding that the program "needs to focus more on what is urgent now." Romanelli responds that the program already addresses urgent needs, with 85% of the funding directly or indirectly supporting ITER. "ITER is the first priority," he says.

–DANIEL CLERY

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Published by AAAS