

PHYSICS

Satellites test general relativity

Wayward craft find new use.

BY ELIZABETH GIBNEY

Two satellites that were accidentally launched into the wrong orbit will be repurposed in the most stringent test yet of a prediction made by Albert Einstein's general theory of relativity — that clocks run more slowly the closer they are to heavy objects.

The satellites, operated by the European Space Agency (ESA), were mislaunched last year by a Russian Soyuz rocket that put them into elliptical, rather than circular, orbits. This left them unfit for their intended use as part of a European global-navigation system called Galileo. But the two craft have atomic clocks on board. According to general relativity, the clocks' ticking should slow down as the satellites move closer to Earth in their orbits, because the planet's gravity bends the fabric of space-time.

On 9 November, ESA announced that teams at Germany's Center of Applied Space Technology and Microgravity in Bremen and at the department of Time-Space Reference Systems at the Paris Observatory will track this acceleration and deceleration. By comparing the speed of the clocks' ticking with the crafts' known altitudes — pinpointed by lasers from monitoring stations on the ground — the researchers can test the accuracy of Einstein's theory.

In 1976, NASA launched an atomic clock aboard Gravity Probe A from Earth's surface, sending it 10,000 kilometres into space, to compare its ticking with that of an identical clock on the ground. But that probe stayed in the air for just shy of two hours. The Galileo satellites, by contrast, will conduct experiments for a year.

ESA expects the results to be four times more accurate than those of Gravity Probe A — enabling the agency to test whether theory agrees with reality to a precision of below 0.004%.

No one expects Einstein's theory, which was published almost 100 years ago (see nature.com/relativity100), to break down — it has passed every test thrown at it. A future ESA experiment called the Atomic Clock Ensemble in Space, or ACES, is scheduled to fly on the International Space Station in 2017. ACES will push Einstein's theory to even greater limits, testing it with a precision that could reach 0.0002%. ■



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Minority researchers in the United States consistently win NIH funding at lower rates than their peers.

EQUALITY

Racial bias haunts NIH grants

Minorities are still less likely to get biomedical funding.

BY ERIKA CHECK HAYDEN

Minority scientists are less likely than their peers to have biomedical research grants funded — and the disparity has barely changed in 30 years, according to data from the US National Institutes of Health (NIH). The numbers, requested by two California researchers to reignite discussion about diversity in the scientific workforce, show no consistent improvement, even though the proportion of minority grant reviewers has climbed.

Pulmonologist Esteban Burchard and epidemiologist Sam Oh of the University of California, San Francisco, shared the data with *Nature* after obtaining them from the NIH through a request under the Freedom of Information Act. The figures show that under-represented minorities have been awarded NIH grants at 78–90% the rate of white and mixed-race applicants every year from 1985 to 2013 (see 'Persistent gap').

Burchard and Oh had hypothesized that they might see an increase in funding for under-represented minorities after a 1994 NIH mandate that investigators must include women and minorities in clinical studies. They reasoned that the increased

emphasis on minority health would create a virtuous circle by boosting grants to minority researchers, who, they posit, would be more likely to focus on those groups and help to fulfil the mandate.

But there seems to have been no such increase. As a result, Burchard and Oh worry that a racial divide could develop between researchers and the people they study. Burchard notes, for example, that a lack of diversity among trial participants may have caused problems for two drug companies that produced an anticlotting drug that had reduced efficacy in East Asians and Pacific Islanders. The attorney-general of Hawaii filed a lawsuit against the companies last year for failing to disclose the issue. "It's a public-health problem," he says.

In a commentary in *PLoS Medicine* next month, Burchard and Oh will argue that scientific workforce diversity helps to ensure that research addresses issues relevant to all.

Other researchers say that airing the new data serves a purpose. "It raises the question in all of us as to the root causes of these disparities," says David Burgess, a cell biologist at Boston College in Chestnut Hill, Massachusetts, who is lead principal investigator of the National Research Mentoring Network,