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Physicists Renew Claim, in New Experiment, of Detecting Dark Matter Particles

By [DENNIS OVERBYE](#)

A team of Italian and Chinese physicists on Wednesday renewed a controversial claim that they had detected the mysterious dark matter particles that astronomers say swaddle the galaxies in halos and direct the evolution of the universe.

The team, called Dama, from “DARk MATter,” and led by Rita Bernabei of the University of Rome, has maintained since 2000 that a yearly modulation in the rate of flashes in a detector nearly a mile underneath the Gran Sasso mountain in Italy is the result of the Earth’s passage through a “wind” of dark matter particles as it goes around the Sun. Other groups of hunters of dark matter have just as consistently failed to find any evidence of the putative particles.

At a meeting in Venice, Dr. Bernabei reported that a new, bigger experiment named Dama/Libra had now observed the same modulation. “No other experiment whose result can be directly compared in a model-independent way is available so far,” she said. The findings increase the chances that the modulation is real, outside dark matter experts say.

Dark matter has taunted astronomers and physicists ever since the astronomer Fritz Zwicky of the [California Institute of Technology](#) pointed out in the 1930s that clusters of galaxies appear to be missing enough visible matter to hold them together gravitationally. Speculation has centered on the possibility that the dark matter consists of hypothetical elementary particles left over from the Big Bang — so-called WIMPs, or weakly interacting massive particles, that are immune to most forces of nature and so can pass through us and the Earth like ghosts.

The Dama team uses sodium iodide, which flashes light when a WIMP smashes into it, as a detector. The first experiment, which ran from 1996 to 2002, had 220 pounds of sodium iodide; the second — which began in 2003 — 500 pounds. In both cases, Dr. Bernabei and her colleagues found that the rate of flashes was highest in June and lowest in December. Loud skepticism by the rest of the dark matter community about Dama’s

claims in 2000 led to hard feelings, apparent on the group's Web site, people.roma2.infn.it/dama/web/home.html

Bernard Sadoulet, a rival dark matter hunter of the University of California, Berkeley, who was present at the conference, said of the new results, "The tension between the measurements of this group and the rest of the community is increasing." He added that it would take time to digest Dama's results.

Juan Collar of the [University of Chicago](http://www.uchicago.edu), a member of another dark matter hunting team, said people were excited about the new results. "You wouldn't put your hand on fire that this is wimps," he said, but agreed that some kinds of WIMPs were still among many possibilities, including that the experiment was in error.

He said that it would take a lot of evidence from many different directions to crack the dark matter problem. When it is done, "We will see it was the work of a lot of people striking gold," he said, adding, "It is very tricky, what we are trying to do."