

Worst Case: Collider Spawns Planet-Devouring Black Hole

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for [National Geographic News](#)

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With the [Large Hadron Collider firing up for the first time Wednesday](#), some critics have speculated that the world's biggest atom smasher could spawn a black hole that would devour Earth.

Most physicists respond that the collider is safe and even necessary for the advancement of humankind ([watch video](#)).

But what if they're wrong?

What exactly would happen if the 17-mile (27-kilometer) circular tunnel under pastoral France and Switzerland opened up a black hole—or black holes?

The Planet Eater

Physicists across the globe are on the edges of their seats, but not because they're worried about a Franco-Swiss [black hole](#).

In recreating the conditions present a trillionth of a second after the big bang, the collider could reveal the nature of [dark matter](#), thought to provide structure throughout the universe, scientists say. The machine could also unmask a theoretical but as yet unseen particle, called Higgs boson—or [the "God particle"](#)—that is believed to give other particles their mass.

There's also a very, very remote chance that the process will spawn black holes—any one of which could assume an odd orbit within Earth, devouring microscopic chunks of matter until the entire planet is gone, physicists say.

This and other harrowing—and equally unlikely—scenarios prompted a couple of independent scientists to sue this past spring to stop the atom smasher. So far they haven't succeeded, and the vast majority of the world's physicists are on board with the project.

(See [photos of the Large Hadron Collider](#).)

"Global Cultural Genocide"

Luis Sancho and Walter L. Wagner, independent astrophysicists in Hawaii, petitioned the U.S. District Court in Honolulu, Hawaii last spring to stop the progress of the Large Hadron Collider (LHC).

In court dockets, the pair call the atom smasher a "dark matter factory" that will spawn self-propelled bombs, "that is, substances, which actively attract and transform our normal matter and whose strength is such that once they become stable they cannot be controlled or destroyed by human beings.

"It is thus extremely dangerous to produce any quantities of strange matter or black holes on Earth."

Allowing the collider to proceed amounts to "global cultural genocide," the plaintiffs alleged.

The Hawaii court has not ruled on the case. The European Court of Human Rights rejected a similar case, brought by

German chemist Otto Rössler, earlier this month.

One Hungry Golf Ball

To form black holes, the Large Hadron Collider would need to generate many billions of times more energy than it can, according to Jonathan Feng, a theoretical particle physicist at the University of California, Irvine.

And even if black holes formed, he said, they would be smaller than protons—which fit in the nuclei of atoms—and would evaporate in a miniscule fraction of a second, "long before they could grow by [absorbing] other matter," he wrote.

"Thus, even if black holes are produced at the LHC, they will not annihilate the Earth."

But Feng was willing to lay out his worst-case scenario, he said, "as long as we make it very clear we're going off the deep end."

If a black hole did form and begin eating Earth, there would be no spectacular display, Feng said.

"This tiny little black hole grows little by little and starts eating up the Earth," he said.

"It has to loop back, and it's a little bit like a comet that has an orbit that keeps going through the Earth."

After absorbing the entire Earth—how long it would take is unclear—the black hole would be nearly the size a golf ball but would have the same mass as Earth did before it was gobbled up.

The baby black hole would simply take Earth's place in the solar system, Feng said.

"The moon would be orbiting around this little 'golf ball,' and the other planets would orbit just as they are now," he added.

And even with the most sophisticated of observational techniques, potential intelligent beings in another galaxy would be oblivious to the change.

The lights of Earth would of course be gone, "but the fact is that no one [in another galaxy] can see that anyway," because the illumination is simply too faint for intergalactic detection.

But Seriously, Folks

University of Michigan research scientist Steven Goldfarb participates in one of the research programs using the Large Hadron Collider.

He said there's "zero probability of forming the types of scary scenarios that are being talked about."

Still, the European Organization for Nuclear Research (CERN), which operates the atom smasher, took its safety mandate seriously during the planning and 14-year construction process, he said.

CERN conducted an independent safety report, and an independent committee checked it.

"A committee of experts not on the LHC, including Nobel laureates, have said the findings are sound," Goldfarb said.

The collider experiments will mimic what has already happened a hundred thousand times when cosmic rays have bombarded Earth, Goldfarb said. If any of the feared possibilities were real risks, then continuous, natural cosmic ray assaults would have destroyed the planet long ago, he added.

In short, Goldfarb, who is based in France near the collider, isn't worried.

"My wife and two children live there," he said, "and they are not going to leave when we turn on the LHC."