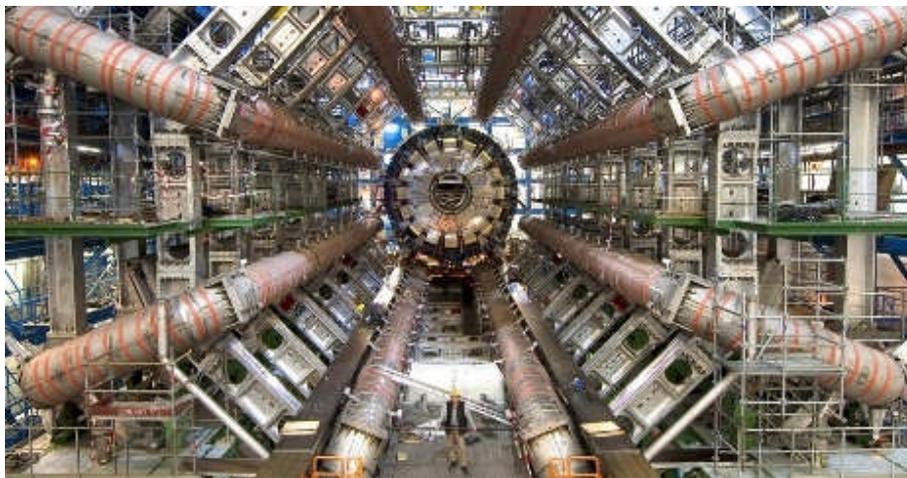


# Doomsday in reverse?

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Maximilien Brice / CERN

A worker is dwarfed by components of the Large Hadron Collider's ATLAS detector during construction in an underground chamber beneath the French-Swiss border.

Is the future trying to save us from ourselves? A series of scientific papers that have been kicking around for a couple of years suggest that if the Large Hadron Collider ever were to find something that shattered the cosmos, the future universe might protect itself by sending a backward-causality wave to break the LHC, or at least warn us.

Sure enough, the LHC is broken - leading The New York Times' Dennis Overbye to wonder half-jokingly whether there was something to the claim after all.

Does that sound spooky? What if I told you that the idea of going back in time to derail out a world-ending particle collider goes back even farther, to a novel written about the fate of the long-canceled Superconducting Super Collider? And that the author of that book is a physicist who has been conducting research into ... *backward causality*?

To quote the actor Keanu Reeves, who has appeared in a couple of time-travel sagas himself: "Whooooa!" And just in time for Halloween!

Each piece of the puzzle is relatively mundane by itself, but when you put them all together, it could serve as the makings for a science-fiction story as way-out as anything you'd see in "Bill and Ted's Excellent Adventure," "FlashForward" or University of Washington physicist John Cramer's book, "Einstein's Bridge":

- The papers on the LHC's potential effects were written by Holger Nielsen of Copenhagen's Niels Bohr Institute and Masao Ninomiya of Japan's Yukawa Institute for Theoretical Physics. They suggest that the LHC could produce exotic particles (such as the long-sought Higgs boson), and that producing those particles would somehow be so catastrophic that the event would send back

a timeline-altering signal to avoid producing them in the first place. They even suggest that physicists create a card game that would determine whether the LHC is allowed to operate at the highest levels. The game would be designed with a minuscule chance of "losing," but if the physicists actually lose the game, the LHC would be limited to lower-energy collisions.

- Nielsen and Ninomiya's papers were published on the arXiv preprint Web site, which is a clearinghouse for all sorts of papers (including suggestions that the LHC could create a time machine or lead to a relativistic hyperdrive). Just because a paper shows up on arXiv doesn't mean it's so. The big reason why the papers are getting a second look is because a helium leak and electrical breakdown forced the LHC to go dark just days after it started up. That's an example of old-fashioned forward causality. Nevertheless, the shutdown, plus the fact that the LHC won't reach full power for more than a year, has led some folks to grumble that the project is jinxed.
- This isn't the first time a big particle-smasher has seemed jinxed. Back in 1990, the Superconducting Super Collider looked like the next big thing in physics - in fact, it would have been more powerful than the LHC. But Congress moved to cancel the project in 1993, due to cost concerns. *Or was that the real reason?*
- In Cramer's book, "Einstein's Bridge," the Superconducting Super Collider ends up getting built - but it opens the door to problems coming in from a metaverse in a bad cosmic neighborhood. That sparks a desperate effort to hold those problems at bay, and change the collider's timeline if possible. Without going into the details, I'll just note that a similar plot twist finds its way into another novel about the Superconducting Super Collider titled "The God Particle."
- Cramer is a particle physicist as well as a novelist and columnist, and one of his latest projects is to determine whether backward causality on a small scale is actually possible under the rules of quantum physics. At last report, he was still having trouble setting up the correct apparatus. But even if the experiment is a failure, he can still make use of the concept. As he told me a couple of years ago, "If it doesn't work, I will write a science-fiction novel where it *does* work. It's a win-win situation."

So what's the bottom line here? Almost nobody thinks the LHC poses a threat worth changing the past over. A lawsuit to stop the collider is still being considered on appeal, however, and as we get closer to the scheduled restart in mid-November, there may be a fresh surge of particle-physics paranoia. If that's the case, don't be surprised - and for heaven's sake, don't panic.