

What if a black hole met an antimatter black hole?

July 27 2015, by Fraser Cain

I've wondered out loud how it might be possible to destroy a black hole because I talk to myself and sometimes there's a camera watching.

I've suggested a bunch of crazy ideas, like blasting it with rockets, shooting lasers at it, smashing planets into it. Nothing would work, everything would just make it bigger and angrier.

Turns out the only way to defeat a black hole is to sit on your hands and wait for it to evaporate. That's not really helpful if you're getting pulled into the black hole, and have sense of immediacy about it.

I mentioned one idea, antimatter, and dismissed it as just another hopeless convertand pointless way to enflame this galactic monstrosity.

But wait, you say, isn't antimatter the opposite of regular matter. If you add a positive number and a negative number together, don't they just cancel each other out?

Why won't that green blooded pointy-eared hobgoblin of a science officer back me on this one?

Why can't you just pump antimatter in to cancel out the regular matter of the black hole and cut a path to escape?

Antimatter is exactly the same as regular matter, except everything is backwards. Electrical charges, spin directions, and configuration of all

the sub-particles that make it up. It's all backwards.

Everything is opposite, except for mass. An anti-electron has the exact same amount of mass as electron.

Here's the part you care about. When equal amounts of matter and antimatter collide, they are annihilated. But not disappeared or canceled out. They're converted into pure energy.

As Einstein explained to us, mass and energy are just different aspects of the same thing. You can turn mass into energy, and you can turn energy into mass.

Black holes turn everything, both matter and energy, into more black hole.

Imagine a regular flavor and an antimatter flavor black hole with the same mass slamming together. The two would be annihilated and turn into pure energy.

Of course, the gravity of a black hole is so immense that nothing, not even light can escape. So all energy would just be turned instantaneously into more black hole. Want more black hole? Put things into the black hole.

If these two objects came together, you'd end up with a black hole with twice the mass that you had before.

Also, creating an antimatter black hole would be expensive. Antimatter is produced in particle accelerators, protons are accelerated in an enormous ring, pushed to nearly the speed of light, and then smashed into each other's faces.

The collective momentum of the particle is converted into [mass](#) using Einstein's famous $e=mc^2$ calculation. Each collision creates a tiny handful of particles that could be collected and contained in a magnetic field to hold them in place and keep them from being annihilated.

According to NASA, a single gram of antihydrogen would cost about \$62.5 trillion to create, the most expensive material we could possibly make on Earth.

It could be more expensive than that. It's possible that the Large Hadron Collider is capable of creating [microscopic black holes](#), although none have been created yet. If physicists could work out that math, then you could create microscopic antimatter [black holes](#) by smashing together anti-hydrogen particles, and the costs involved would dwarf the production of antimatter itself.

The bottom line is: If a regular black hole and an antimatter black hole got black-hole-married in space, they wouldn't vanish.

Feeding in antimatter won't do any good, it's just like regular matter or energy. It only makes the black hole more massive. That should save you some money in wasteful antimatter production.

You're welcome. And I'm sorry. Farewell traveler, your [antimatter](#) stores won't save you now.

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