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Ask Dr. Universe

If there were a black hole between the Earth and moon, what would we see?
—Steven Raabe

Donuts in the sky. That's the easy answer.

The more difficult, and probably much more painful, answer depends on your view. You'd see a spot in the sky where light disappears as if going down the bathtub drain. You might see the oceans lift from the Earth and float away into space. You could see the black hole change from a point of nothingness to a color-shifting tiny orb. It would deepen from red to blue as it sucks everything into it, including you, stretching everything out like taffy on a medieval torture device.

Depending on the black hole, some say you might see the future. Or the beginning of all time. Or an entirely different universe.

Don't worry because chances are you'll see none of this. The nearest black hole is 1,600 light years away. That's 9 quadrillion miles. In other words, crazy far.

Anyway, to explain the sky donuts I talked to Michael Allen, an astronomer whose office is on the top floor of the tallest building at Washington State University. He says what a black hole does is take a lot of stuff and put it into a small space. It's like taking a gallon of milk and making it fit into a cup. Then making that cup fit into a tablespoon. Then doing that a billion times.

A black hole isn't a hole at all but an orb, like the Earth. It's called a hole because it pulls everything toward it so strongly that almost nothing can escape. Though black holes can have more material in them than our own sun, some of them are smaller than real donuts (glazed or otherwise). They can even be smaller than a grain of sand.

Despite this, a black hole has unbelievably strong gravity. It pulls everything into it, including light, and squishes it into a point of near nothingness.

So what would we see if a black hole showed up between the moon and us?

"Rings," says Allen. Ring inside of ring inside of ring, getting bigger and bigger. "Like multiple donuts in the sky."

It sounds delicious. But why?

Gravitational lensing, Allen says, which is a scientist's way of saying the light is bent. You know how water streaming out of a hose curves down to the ground? It doesn't shoot out in a straight line because the Earth's gravity is pulling it down. The black hole is doing this as well, except instead of water, it's light and instead of a hose it's the moon.

In this way, the hole gobbles up most of the light the moon is reflecting. Not all of it, though. Other light from the moon is grabbed by the black hole's insanely strong gravity and bent like a bar of steel, curving around the black hole like that stream of water from the hose.

Since light is used to traveling in straight lines, this curved light appears distorted when it reaches our eyes. When the distortion is strong enough—say, when there's a black hole right next to our planet!—multiple images appear.

And since a black hole is the source of such a distortion, there's a big, black hole in the middle of what we see.

So the next time you're eating a donut, pretend you're a black hole and eat the whole thing, letting none of it escape.



ILLUSTRATIONS: DAVID HUCK

Last words



In plain sight

Broken Arrow sits in the foyer of the Terrell Library. Thousands pass by it each week, most not realizing it is the work of artist Harold Balazs '51, or that it was a gift from the Friel family whose lives entwined with the history of the school long after graduation.

Though he planned to be a teacher, Jack Friel '23 started his 30-year career as the Cougars' head basketball coach in 1928. As a student, he met Catherine (Matthews) Friel '23, '58 MAT in the original college library. They married a few years later and raised their family just a few blocks from campus. Three of their four children attended Washington State.



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