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News & Comments

Nearest Star Spaghettified by a Black Hole - Secrets Revealed

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Previously it was known that when a star wanders too close to a black hole, it gets sucked in then some of its matter gets superheated on the way in, thus radiating large amounts of X-rays. But now a team of astronomers from the University of California at Berkeley, using a specialized spectrograph at Lick Observatory studied the tidal disruption even and found that there is more to the story. They found the hidden secrets of what happens when a star encounters a supermassive black hole. Spaghettification means that when the star wanders too close to the supermassive black hole, the gravitational pull rips the star apart while stretching some of its material. But now with the latest study, the scientists suggest new findings in the tidal disruption events. The team found Some of the doomed star's material was sent into space by intense winds flowing outward from the event. The weirdness of it all is part of what makes it so interesting. According to Professor Wenbin Lu "These stellar tidal disruption events are one of the very few ways astronomers know the existence of supermassive black holes at the centers of galaxies and measure their properties. However, due to the extreme computational cost in numerically simulating such events, astronomers still do not understand the complicated processes after a tidal disruption." The Berkeley team observed optical light from the blast, called AT2019qiz, which revealed that much of the star's matter was flung outward in a powerful wind. Astronomers believe that the cloud was most likely spherically symmetric based on new data on the light's polarization, which was nearly zero at visible wavelengths. It's the first time the shape of the gas cloud around a tidally spaghettified star has been deduced. In most of the dozens of tidal disruption events observed to date, astronomers have not seen high-energy radiation, such as X-rays, caused by the material that is ripped from the star and dragged into the disk around the black hole before falling inward. "The interesting fact here is that a significant fraction of the material in the star that is spiraling inward doesn't eventually fall into the black hole — it's blown away from the black hole," said UC Berkeley graduate student Kishore Patra, lead author of the study.

KEYWORDS

Astronomy, Astrophysics, Black Hole, Popular, UC Berkeley, Spaghettification, AT2019qiz, X-rays, tidal disruption events