Is our galaxy's black hole shredding asteroids, planets?

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The black hole at the center of our galaxy may be shredding asteroids on a daily basis, and maybe a planet every few hundred years—each time with a bang, some astronomers propose.

Kastytis Zubovas of the University of Leicester, U.K. and colleagues developed the theory to explain small, near-daily flares detected around an object believed to be the black hole. Their paper on the study has been submitted to the research journal *Monthly Notices of the Royal Astronomical Society* and is also posted online.

A black hole is an object so compact that its gravity overwhelms and draws in anything that strays too close, even light rays. Particularly heavy, or "supermassive," black holes are believed to lurk at the centers of most galaxies, anchoring their stars together.

The black hole at the center of our Milky Way galaxy is dubbed Sgr A*. While black holes aren't directly visible, the activity around them gives them away, astronomers say. This activity includes long-distance gravitational effects, and shorter-distance effects in which the mighty gravitational field literally shreds objects being dragged into the black hole. "Tidal" effects like that occur because the gravity is stronger at one end of the disturbed object than the other. The broken-up objects shine as they disintegrate.

The new study isn't the first proposal regarding planets potentially destroyed near black holes.

Fat, doughnut-shaped shrouds of dust surrounding about half of the biggest black holes could be the result of high speed crashes between planets and asteroids near the black holes, some say. A member of Zubovas' team, Sergei Nayashkin, put forth that proposal in the Oct. 31 advance online issue of the same journal, along with two other researchers.

The new study looks more specifically at "our" supermassive black hole, and the mysterious mini-flares surrounding it.

A typical supermassive black hole in a galaxy is expected to tear apart a star every 10,000 years or so, but asteroids are much smaller and more common, Zubovas and colleagues wrote. Planets may lie between asteroids and stars in terms of size and abundance.

The researchers wrote that in their new work, they estimated "the asteroid disruption rates, and the distribution of the expected luminosities" from the resulting flares, in the middle of our galaxy. The result was a reasonable fit with observations, they added. The team wrote that they assumed that the asteroid population per star near the galactic center is not too different from that near the Sun.

"The fact that there are many more asteroids than stars and that the asteroids are much smaller than stars would naturally explain why Sgr A* flares are much more frequent but much less luminous and shorter than the stellar tidal disruption events," they added. The flares occur daily and last for a few hours, as opposed to months in the case of stars, the scientists went on.

Tidal disruptions are expected to produce light because of the tremendous amount of energy released as a giant object is torn apart, like a rubber band snapping in slow motion. "The combination of tidal 'grinding' of large asteroids into smaller fragments and evaporation of the latter may destroy the asteroids efficiently and turn their bulk energy into heat," the group wrote.

Disruptions of full planets are probably much rarer, but there one might have occurred 300 years ago, Zubovas and colleagues wrote. The direct evidence would be gone, they added, but the effects possibly are visible as a "light echo" on a nearby cloud of gas—whose surface appears brighter to this day as a possible result of light from the original event bouncing off it. The cloud is is known as molecular cloud Sgr B2.

A planetary disruption near a black hole might not itself be a tragic event for living beings on that planet, Nayashkin and colleagues wrote in their earlier study. That's because it's unlikely that anything could be alive at that distance from a black hole anyway.