BLACK HOLES, WORMHOLES AND WHITE HOLES

BLACK HOLES **:** A black hole is a region of spacetime where gravity is extremely strong that nothing — no electromagnetic radiation such as light — can escape from it. The theory of general relativity predicts that a sufficiently compact mass can deform spacetime to form a black hole. British astronomers Louise Webster and Paul Murdin at the Royal Greenwich Observatory and Thomas Bolton, a student at the University of Toronto, independently announced the discovery of a massive but invisible object in orbit around a blue star over 6,000 light-years away. Astronomers believe that supermassive black holes lie at the center of virtually all large galaxies, even our own Milky Way.

Astronomers can detect them by watching for their effects on nearby stars and gas. This chart shows the relative masses of super-dense cosmic objects. By their calculations, quantum mechanics could feasibly turn the event horizon into a giant wall of fire and anything coming into contact would burn in an instant. In that sense, black holes lead nowhere because nothing could ever get inside. This, however, violates Einstein's general theory of relativity.

In 1971, Stephen Hawking proposed the area theorem, which set off a series of fundamental insights about black hole mechanics. The theorem predicts that the total area of a black hole's event horizon — and all black holes in the universe, for that matter — should never decrease.

WORMHOLES : A wormhole (or Einstein–Rosen bridge or Einstein–Rosen wormhole) is a speculative structure linking disparate points in spacetime, and is based on a special solution of the Einstein field equations. Wormholes are consistent with the general theory of relativity, but whether wormholes actually exist remains to be seen .

Einstein's theory of general relativity mathematically predicts the existence of wormholes, but none have been discovered to date. A negative mass wormhole might be spotted by the way its gravity affects light. The boom in wormhole research continues. So far, nothing like a made-to-order human-sized wormhole machine looks likely, but the results do show progress. “We're learning that we can, in fact, build wormholes that stay open using simple quantum effects,” Grado-White says .We place two massive objects in two parallel universes (modeled by two branes). Gravitational attraction between the objects competes with the resistance coming from the brane tension. For sufficiently strong attraction, the branes are deformed, objects touch and a wormhole is formed.

Einstein's theory of general relativity suggests wormholes are possible, although whether they really exist is another matter. In many ways, wormholes resemble black holes. Both kinds of objects are extremely dense and possess extraordinarily strong gravitational pulls for bodies their size.

The world as we know it has three dimensions of space—length, width and depth—and one dimension of time . time travel is indeed a real thing. But it's not quite what you've probably seen in the movies. Under certain conditions, it is possible to experience time passing at a different rate than 1 second per second. According to theoretical physicist Carlo Rovelli, time is

an illusion: our naive perception of its flow doesn't correspond to physical reality. He posits that reality is just a complex network of events onto which we project sequences of past, present and future . time does not literally "bend". A massive object modifies the proper time interval around it such that an outside observer would see objects near the mass experience less time and spacetime intervals would have their spatial components modified accordingly.

WHITE HOLES **:** In general relativity, a white hole is a hypothetical region of spacetime and singularity that cannot be entered from the outside, although energy-matter, light and information can escape from it. In this sense, it is the reverse of a black hole, which can be entered only from the outside and from which energy-matter, light and information cannot escape.

White holes appear in the theory of eternal black holes. In addition to a black hole region in the future, such a solution of the Einstein field equations has a white hole region in its past. This region does not exist for black holes that have formed through gravitational collapse, however, nor are there any observed physical processes through which a white hole could be formed. No spacecraft will ever reach the region's edge. Objects inside a white hole can leave and interact with the outside world, but since nothing can get in, the interior is cut off cut off from the universe's past: No outside event will ever affect the inside.

Black holes are created when stars, much more massive than our Sun, die catastrophically in a supernova.White holes are created when astrophysicists mathematically explore the environment around black holes, but pretend there's no mass within the event horizon . A white hole is a bizarre cosmic object which is intensely bright, and from which matter gushes rather than disappears. In other words, it's the exact opposite of a black hole. But unlike black holes, there's no consensus about whether white holes exist, or how they'd be formed. The mass the white hole is expelling is also being turned into energy for the black hole. So if a white hole and black hole collided, we'd have a massive black hole roaming around the Universe, destroying everything in its path.