BLACK HOLE INFORMATION

A black hole is a region of space time from which gravity prevents anything, including light, from escaping. The theory of general relativity predicts that a sufficiently compact mass will usually deform spacetime to form a black hole. Around a black hole, there is a mathematically defined surface called an event horizon that marks the point of no return. The hole is called "black" because it absorbs all the light that hits the horizon, reflecting nothing, just like a perfect black body in thermodynamics Quatum space theory in curved predicts that event horizons emit radiation like a black body with a finite tempurature. This temperature is inversely proportional to the mass of the black hole, making it difficult to observe this radiation for black hole of steller mass or greater.

Properties & structures

The no hair theorem states that, once it achieves a stable condition after formation, a black hole has only three independent physical properties: mass, charge, and angular momentum Any two black holes that share the same values for these properties, or parameters, are indistinguishable according to classical (i.e. non-quantum) mechanics These properties are special because they are visible from outside a black hole. For example, a charged black hole repels other like charges just like any other charged object. Similarly, the total mass inside a sphere containing a black hole can be found by using the gravitational analog of Gauss's law, the ADM mass, far away from the black hole. Likewise, the angular momentum can be measured from far away using frame dragging by the gravitomagnetic field.

Formation & evolution

Considering the exotic nature of black holes, it may be natural to question if bizarre object could exist in nature or to suggest that they are merely pathological soultion to Einstien himself wrongly thought that black holes would not form, because he held that the angular momentum of collapsing particle would minority of relativists continued to contend that black holes were physical objects,] and by the end of the 1960s, they had persuaded the majority of researchers in the field that there is no obstacle to forming an event horizon.Once an event horizon forms, Penrose proved that a singularity will form somewhere inside it. Shortly afterwards, Hawking showed that many cosmological solutions describing the BIG BANG have singularities without scalar fields or other exotic matter (see pengrose hawking sigularity theorem)

Observational evidence

By their very nature, black holes do not directly emit any signals other than the hypothetical Hawking radiation; since the Hawking radiation for an astrophysical black hole is predicted to be very weak, this makes it impossible to directly detect astrophysical black holes from the Earth. A possible exception to the Hawking radiation being weak is the last stage of the evaporation of light (primordial) black holes; searches for such flashes in the past have proven unsuccessful and provide stringent limits on the possibility of existence of light primordial black holes. NASA's Fermi gama ray Telescope launched in 2008 will continue the search for these flashes.

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