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Black Hole Unobservability in General Relativity

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Abstract: According to general relativity gravitation effects any objects carrying the energy. Therefore, virtual photons (as real ones) and gravitons (real and virtual) must be attracted by massive bodies. As a result, black holes must not radiate gravitational waves and appear to be electrically and gravitationally neutral.
Keywords: black holes, general relativity, relativistic gravidynamics.

As known (e.g. [1]), black holes (BH) are massive objects having so a strong gravitational field that they can not emit light quanta (photons).

Recall that according to general relativity (GR), a mass E/c^2 corresponds to each energy E, i.e. energy plays the role of "gravitational charge". (In the general case of the continuous distribution of matter, it is the energy-momentum tensor figuring in the right side of Einstein-Gilbert's equation.)

Therefore, photons in GR (like material bodies) are attracted by a gravitational field. BH are usually characterized by three parameters: mass, electric charge, and angular momentum. It is considered that BH send into the surrounding space no signals and interact with the outside world only by their static gravitational fields (e.g. [2]).

The talk was about real photons, however, a force is transmitted by the exchange of virtual particles (field quanta) according to the modern representation based on the quantum field theory. So, virtual photons carry an electromagnetic interaction and since the interaction is accompanied by the energy transmission, this means that the virtual photons themselves carry some energy. Therefore, according to GR, they must be attracted by a gravitational field just as real photons. As a result, the electric field of charged BH cannot desert them. They seem electrically neutral to an outward observer. This confirms the thesis [2] that BH interact with the surrounding world by the gravitational field only. (Although, most likely, it is not obviously implied for this that BH are not charged).

But, according to GR, the great thing here is that the mass of a charged body must have an influence on the formation of its electric field. The bigger the mass, the greater the influence. This will be effectively perceived as an electric charge change.

A more wonderful picture takes place if we apply the previous reasonings to the near analogues of photons – gravitational field quanta (gravitons). Since they also carry the energy, then they must be attracted by massive bodies. It means for the real gravitons that gravitational waves cannot desert BH. As to virtual gravitons, this means the gravitational field absence of BH! As a result, BH lose their distinctive properties to absorb flying bodies and to form double star systems and to cause the accretion of the surrounding gas.

Thus, according to GR, BH are practically unobserved. They can interact with flying bodies only due to their weak field. As we see, the consistent application of GR principles leads to the very strange (absurd) consequences.

Earlier, it has already been emphasized [3] that BH are not a specific consequence of GR. And their very distinctive property is described by the quantum equation (confirmed by experiment) for the photon frequency emitted in a gravitational field (with potential Φ)

$$\nu_g=\nu(1+\Phi/c^2). \quad (1)$$

As clearly seen, the stronger the gravitational field, the smaller the frequency of a radiated light. In the limit, when $|\Phi|\to c^2$, then $\nu_g \to 0$. Thus, the atoms of BH lose radiation ability. Recall that Eq.(1) follows from the law of energy conservation [4]

$$M^*c^2+M^*\Phi=Mc^2+M\Phi+h\,\nu_g \quad (2)$$

at photon emission in a gravitational field. Emphasize that Eq.(2) is a consequence of relativistic gravidynamics or Lorentz-covariant theory of gravity [5] (alternative of GR). The mass is the "gravitational charge" in this theory (as in Newton's theory). Therefore, photons and gravitons are gravitationally neutral since their masses are zero. Thus, the difficulties inherent in GR do not take place here.

Conclusion

BH are considered as usually being a consequence of GR. It is found, however, that BH are unobservable according this theory.

References

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