

The Origin and Its Meaning

Black Holes

A "black hole" is a small region at the center of a galaxy, the region exhibiting huge gravitational attraction.

- The term "black" is because not even light can escape the gravitation. The black hole allows nothing out; it is literally black.
- The term "hole" is because it "sucks" the surrounding matter into it as if it were a bottomless pit, a hole.

Such a black hole should eventually suck everything into it, as follows. Because gravitation is proportional to mass:

- As the hole sucks in more mass its gravitational attraction becomes even stronger.
- And, as its gravitational attraction becomes even stronger it can suck mass in even more strongly.

But, black holes appear to affect only the region near them. Most of a black hole's galaxy acts as if there were no black hole, merely an ordinary gravitating mass, there.

This behavior is readily explained because ...

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... The Origin and Its Meaning

does for physics what Euclid did for geometry -- it supersedes mere empirical conclusions with derivation of all of physics.

20th Century physics's relativity shows that the linear Newton's 2nd Law of Motion, $F = m \times a$, becomes non-linear at large speeds.

Similarly the derivation of gravitation in **The Origin and Its Meaning** shows that gravitation becomes non-linear at large accelerations.

- In strong gravitational fields the strength of the action increases hyperbolically as the field increases.
- Black holes exhibit such strong gravitational fields near the black hole. Farther out the field is much less and the gravitation is normal.