

## THE FIRST BLACK HOLE IMAGE AND HOW IT WAS CAPTURED

**Kostandov T.A.** *castim234@gmail.com*

*Dmytro Motornyi Tavria State Agrotechnological University*

The first image of the black hole was captured in April 10, 2019. It changed the understanding of existence of black holes. Nowadays, black holes are among the most important research objects in the universe. For instance, Laura Mersini-Houghton, a physics professor at UNC-Chapel Hill, has proven mathematically in 2014 that black holes can never come into being in the first place [3].

Black holes are actually extremely compressed objects that contain an extraordinary amount of matter within a tiny area. Because of their compact nature, they exert an extremely powerful gravitational force from which nothing – not even light – can escape [2]. So, it was previously known that since black holes do not emit light and do not reflect it, their presence can be detected only by theoretical methods; for example, scientists indicate the rapid rotation of stars and the deviation of light rays near the centers of galaxies. The main characteristic of a black hole is the size of its event horizon – the boundary, beyond which nothing can return back. For this reason astronomers could not take a photo of a black hole before 2019. According to the web-site *interestingengineering.com* [1], the previously used algorithms were incorrect: researchers tried to take a photo of that black hole which is closer to our planet. After multiple experiments it was established that the glow of the black hole is so strong that it's easier to take a photo of a hole which is 50 million light years distant from the Earth than of any black hole in the range of 5 thousand light years. The essence of the presented effective image capturing method includes a complex network of radio telescopes scattered around the world and operating in the millimeter range. This telescope network known as the Event Horizon Telescope has been collecting gigabytes of data (images) for over a decade. Finally, in the course of the last year collaboration, specially selected team of international astronomers processed the data. Katie Bouman, a 29-year-old PhD in Computer Science, led the team creating the algorithm for visualizing data from the telescope network [2].

The main purpose of black holes existence is still unknown. It is only established that black holes can absorb everything in their path and this is a problem for our planet, although the speed at the nearest hole is not so high. Black holes also represent unlimited research field despite the fact that the black hole problem has been challenging astrophysicists for over 50 years. Scientists believe that with the help of black holes it (theoretically) is possible to overcome any large distances, but unfortunately there is no material so far which is able to withstand such stress [3].

To conclude, black holes are fraught with many mysteries and very soon astronomers will be able to solve them all due to interdisciplinary collaboration, which will definitely play the significant role in the scientific future.

### References

1. How Was the First Picture of a Black Hole Taken? *Interesting engineering*: website. URL: <https://interestingengineering.com/how-was-the-first-picture-of-a-black-hole-taken> (Last accessed 04.10.2019)
2. NASA's new black hole visualisation shows how gravity warps our view of them. *ABC*: website. URL: <https://www.abc.net.au/news/science/2019-10-02/nasa-black-hole-visualisation/11563802> (Last accessed 01.10.2019)
3. Черных дыр не существует? *Популярная механика*: website. URL: <https://www.popmech.ru/technologies/48208-chernykh-dyr-ne-sushchestvuet/> (Last accessed 04.10.2019)

**Language adviser: Zaitseva N.V., Senior Teacher of the Department of Foreign languages**