

THE FASCINATION OF BLACK HOLES

Chapter 3

Black Holes – The Secrets of the Universe

Do we need to worry that there is a supermassive black hole at the centre of the Milky Way?

No. Even though black holes do rotate and are capable of swallowing objects of any size, they don't move towards matter. They must wait for matter to cross their event horizon. If the surrounding area does not have much matter, the hole is considered to be less active. Moreover, Sagittarius A* is 26,000 light years away from us. Moving at the speed of light, it would take 26,000 years to travel from here to there.

So what are the implications of black holes for science, and what do they tell us about the history and future of our universe? Black holes are found in many galaxies other than the Milky Way. They seem to play a key role in the evolution of the universe. To understand this role, astronomers use telescopes to look far back into the past, using light as a source of information. In some cases, this light has taken many billions of years to travel from distant galaxies. For example, information from light suggests that quasars and black holes already existed 11 billion years ago when our galaxies were forming.

Using this information, we can run simulations to demonstrate how galaxies have grown. These simulations also show how this growth is stopped when parts of the galaxies collapse, and black holes are formed.

Black holes help us understand how the universe can continue to expand and contract at the same time. This is because their strong gravitational pull compresses a lot of mass into the smallest space. In doing so, they release so much energy that entire galaxies can be reorganised.

Although technology allows us to peer deeper and deeper into space, black holes still hold many secrets. The terms we use to describe them are just the best theorems that we currently have. Nobel Laureate Reinhard Genzel reminds us of this:

"Many, many measurements have come together in recent years to provide evidence that what we see in the universe is consistent with these objects, these bizarre objects, that were predicted by the theory of general relativity."

If and when we will discover these secrets, we do not know, but one thing is clear: the search for the origins of the universe continues.