

THE  
NOBEL  
PRIZE

# PHYSICS PRIZE 2020

•

Black Holes and the Milky Way's  
darkest secret

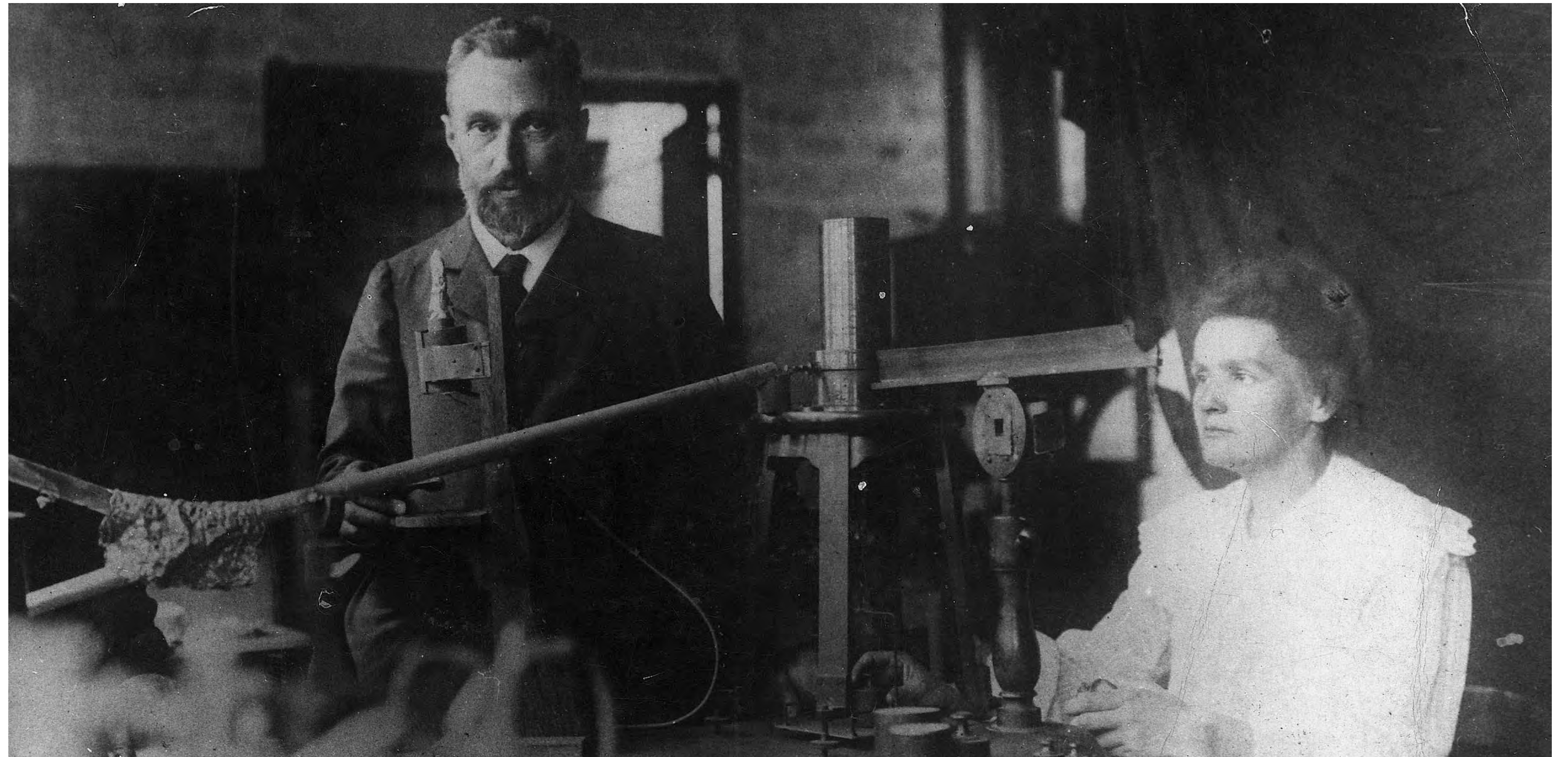
# The Nobel Prize in Physics

“to the person who made the most important discovery or invention in the field of physics”



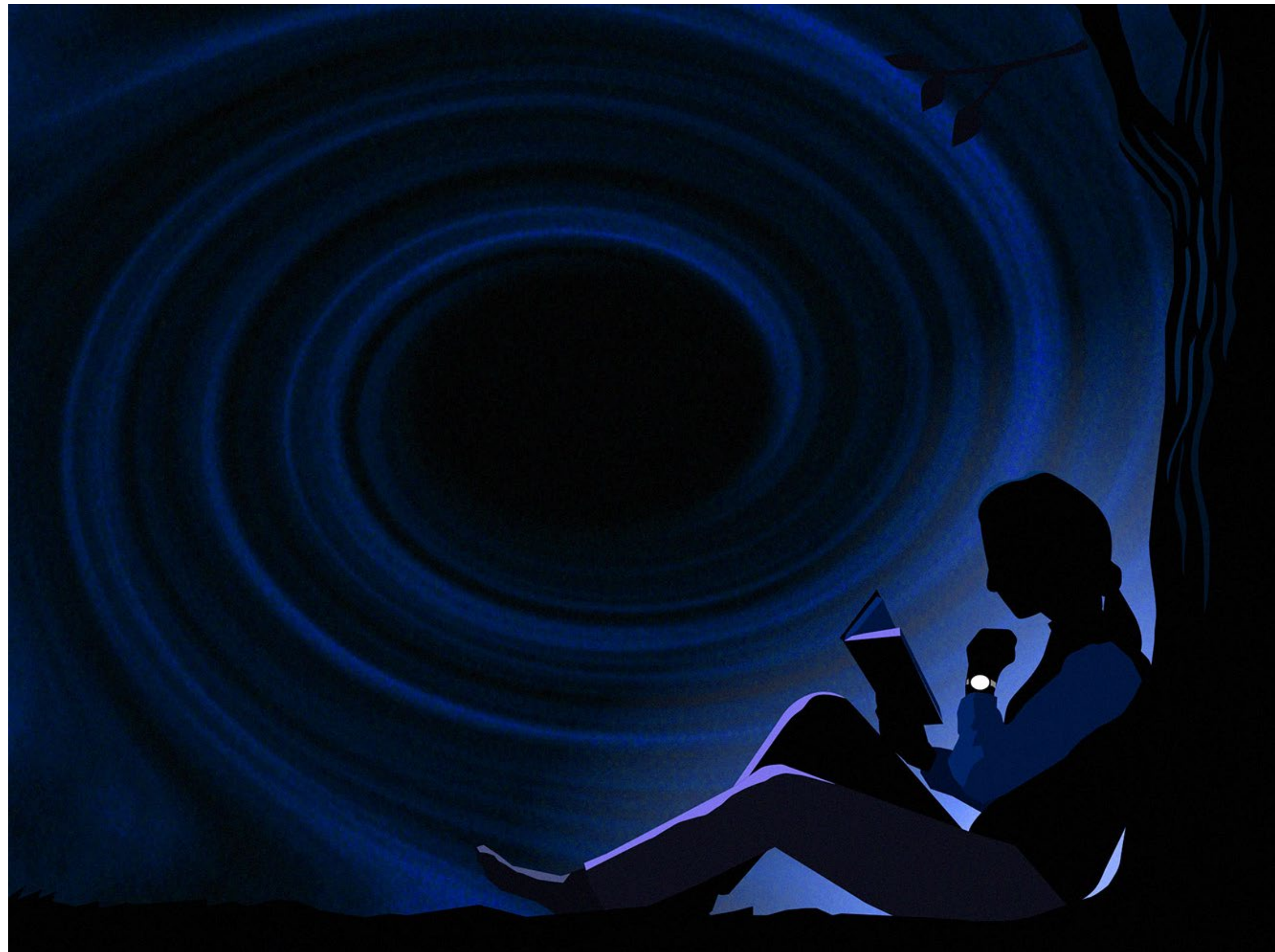
## Who is rewarded with the Physics Prize?

This prize rewards important discoveries or inventions in the field of physics.



# The 2020 Physics Prize

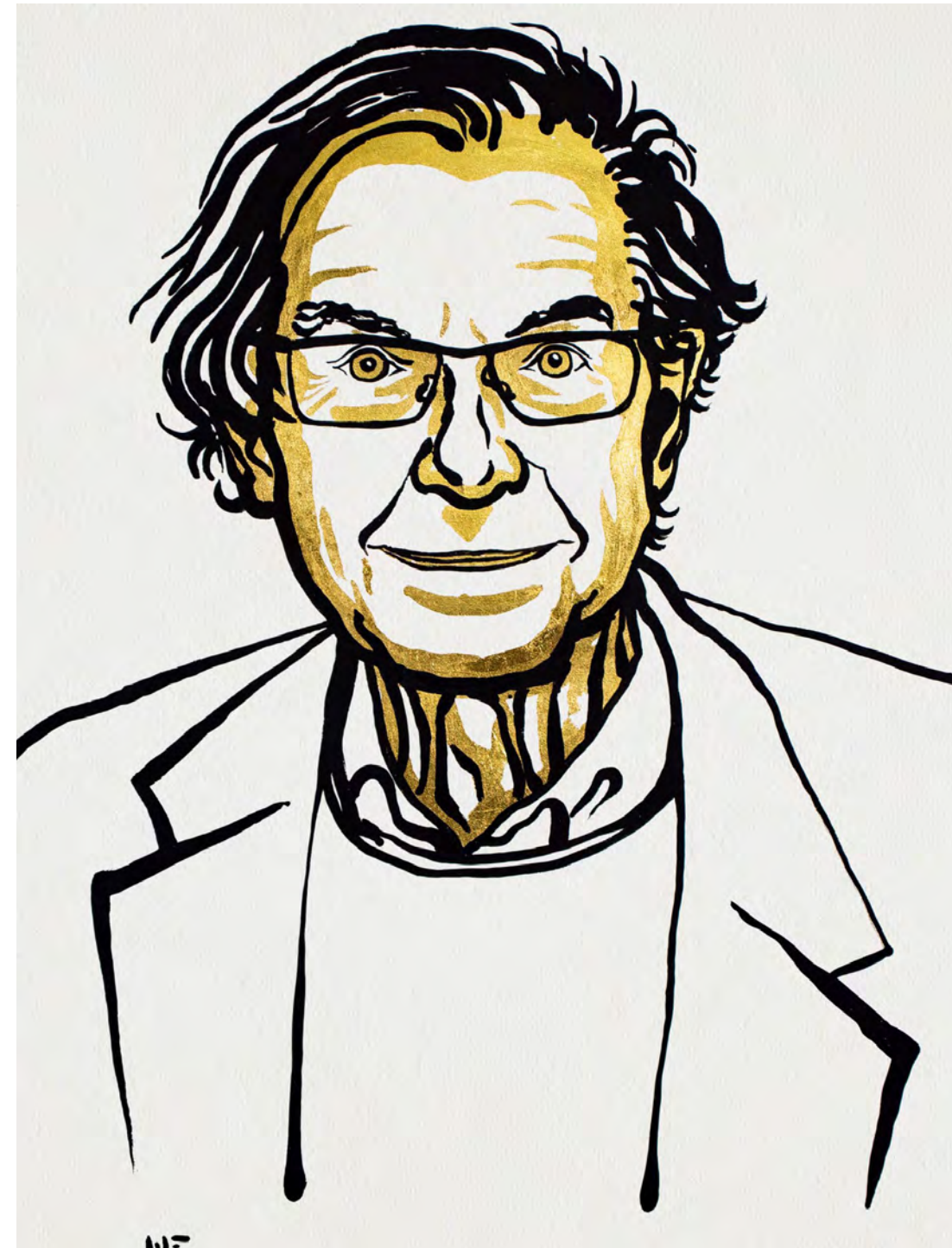
The prize rewards researchers for their discoveries about one of the strangest phenomena in the universe: black holes.



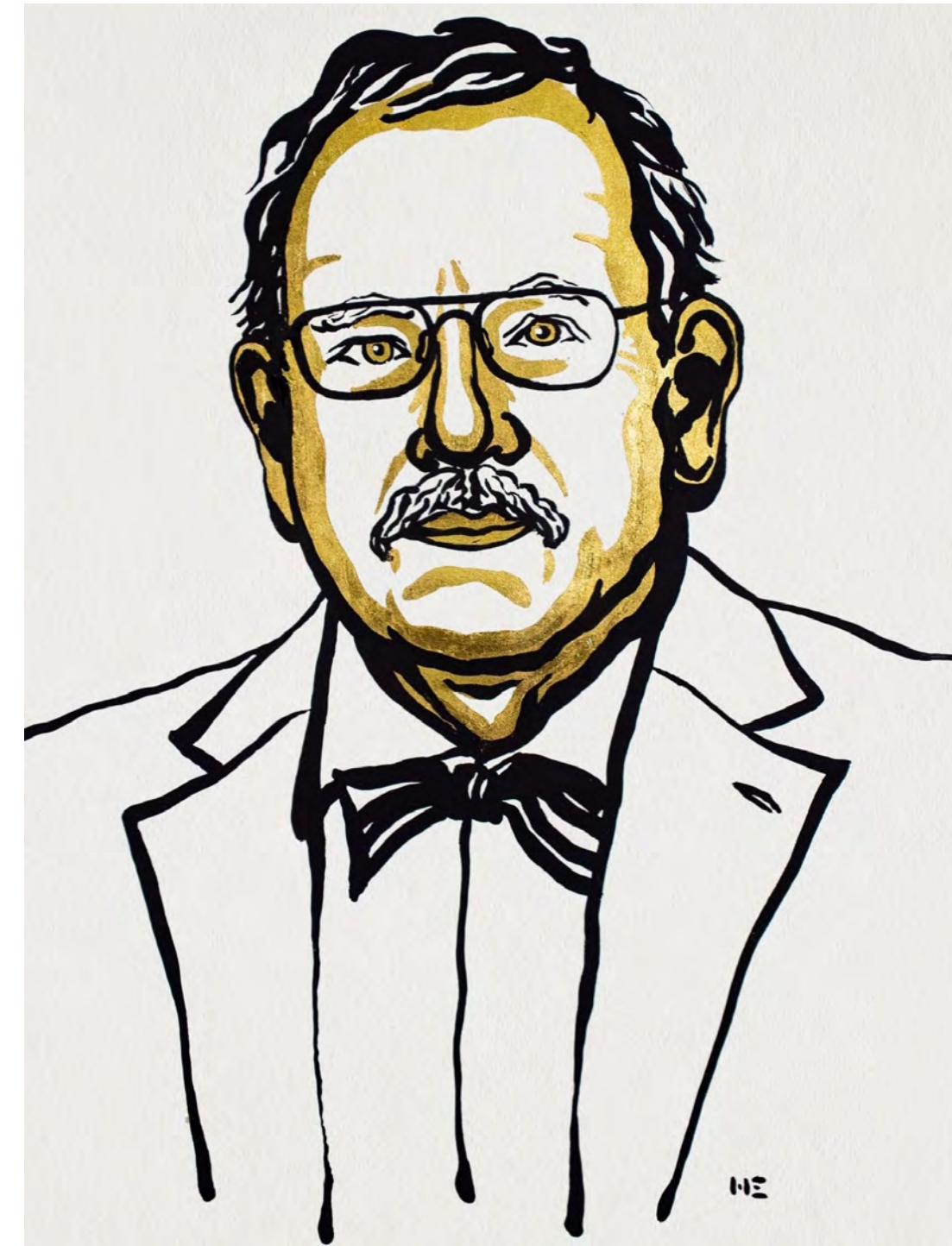
# The 2020 Physics Laureates

Roger Penrose  
“for the discovery that black hole formation is a robust prediction of the general theory of relativity”

Reinhard Genzel and Andrea Ghez  
“for the discovery of a supermassive compact object at the centre of our galaxy”



Roger Penrose  
Born: 1931, United Kingdom



Reinhard Genzel  
Born: 1952, Germany



Andrea Ghez  
Born: 1965, USA

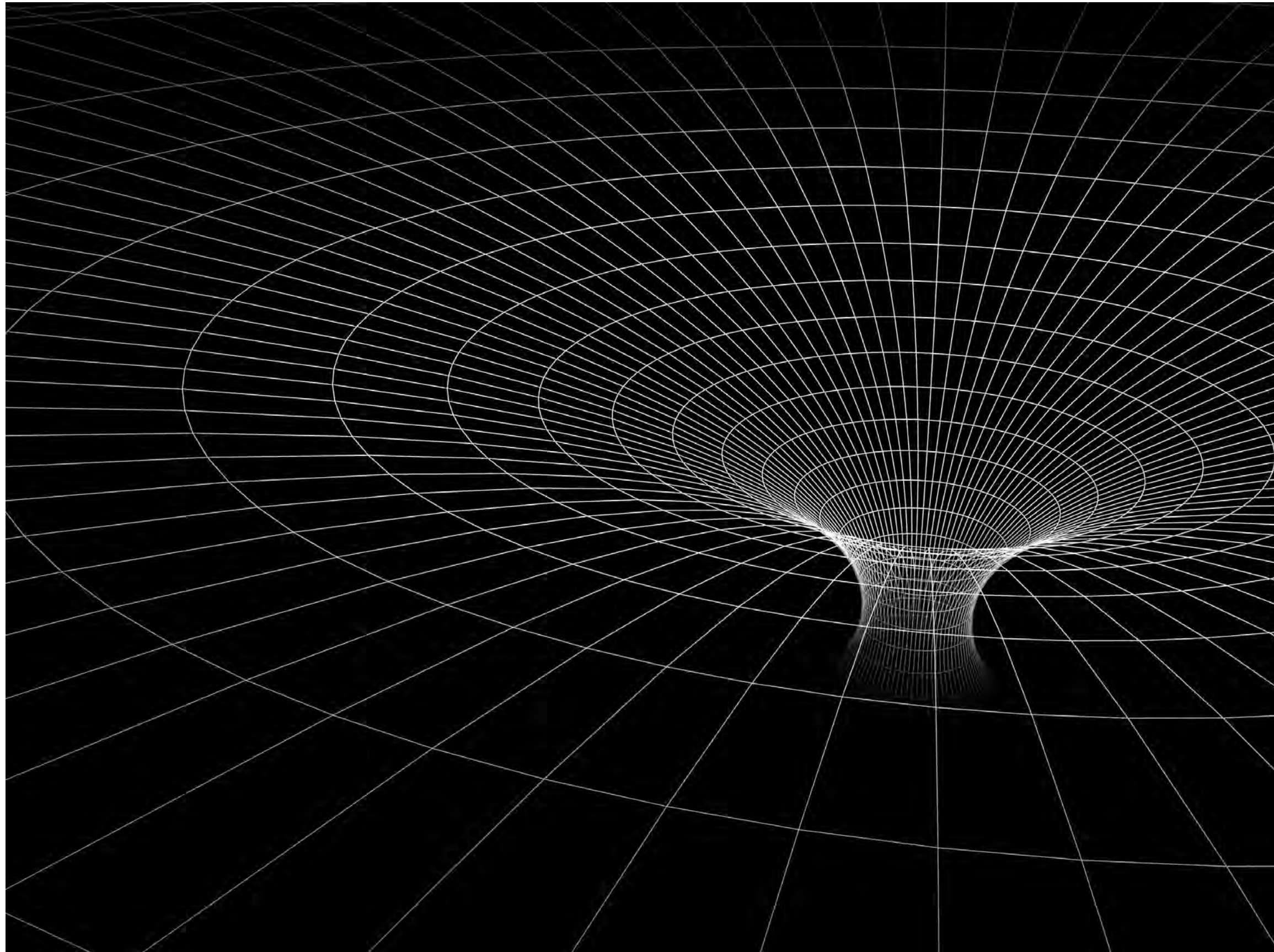
# Black holes

Black holes are incredibly heavy and compact objects.



IMAGE: EVENT HORIZON TELESCOPE

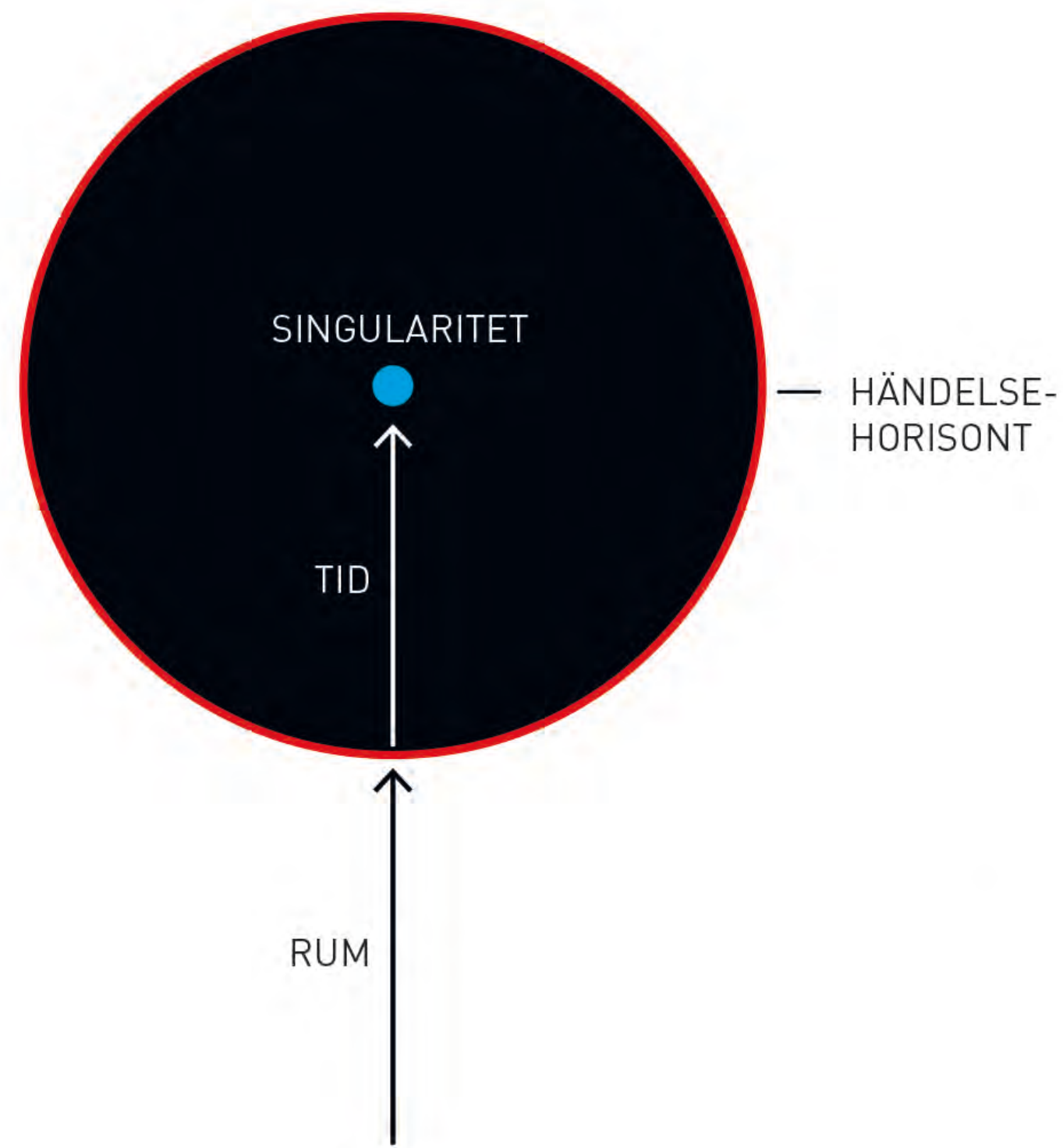
# Einstein's theory of relativity



Einstein's general theory of relativity suggests that black holes are theoretically possible.

# New mathematical tools for black holes

Roger Penrose used mathematical methods to demonstrate that the general theory of relativity leads to the formation of black holes.





# Observing a black hole

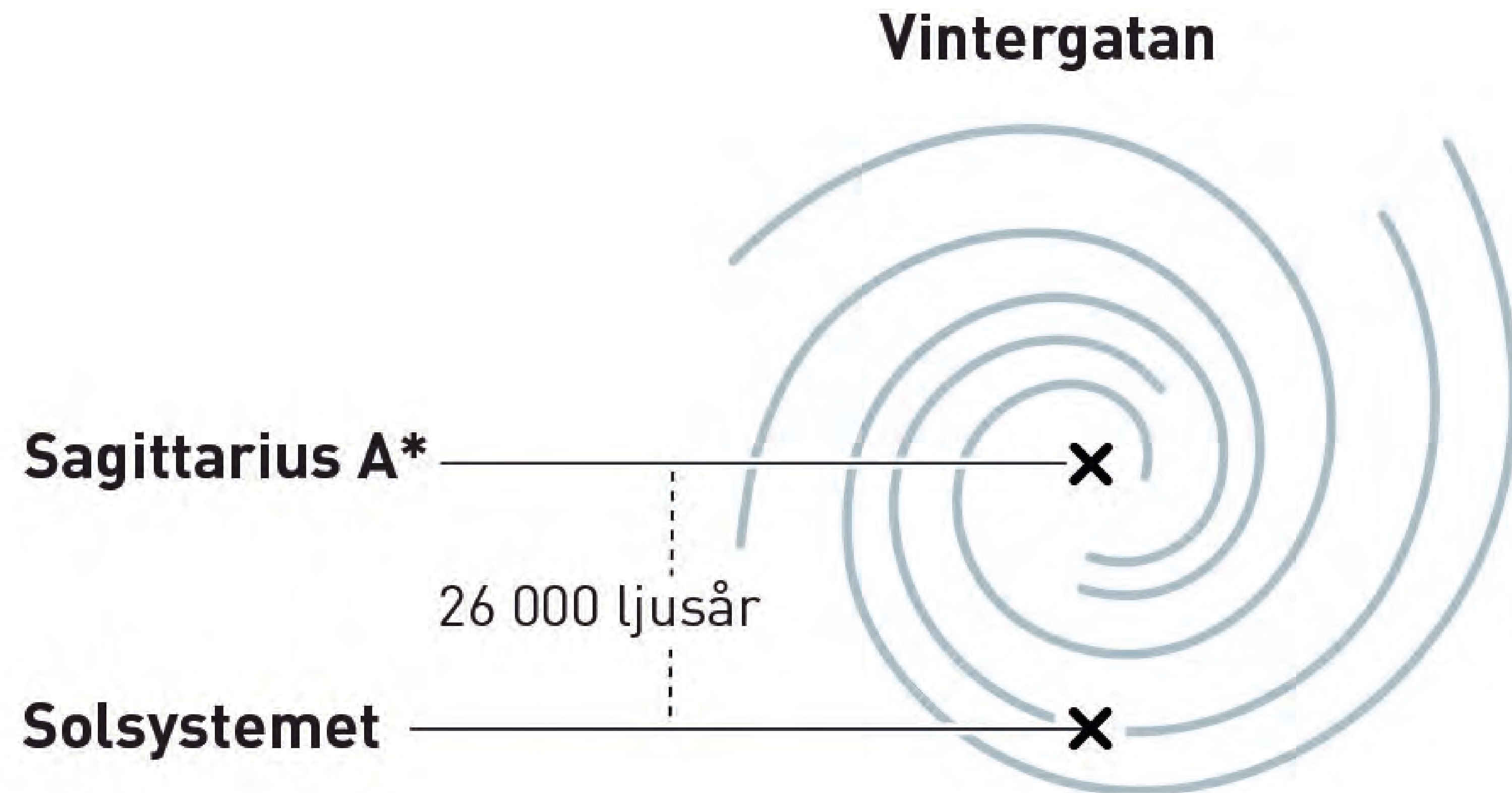
Using powerful telescopes scientists are making observations that increase our understanding of black holes.



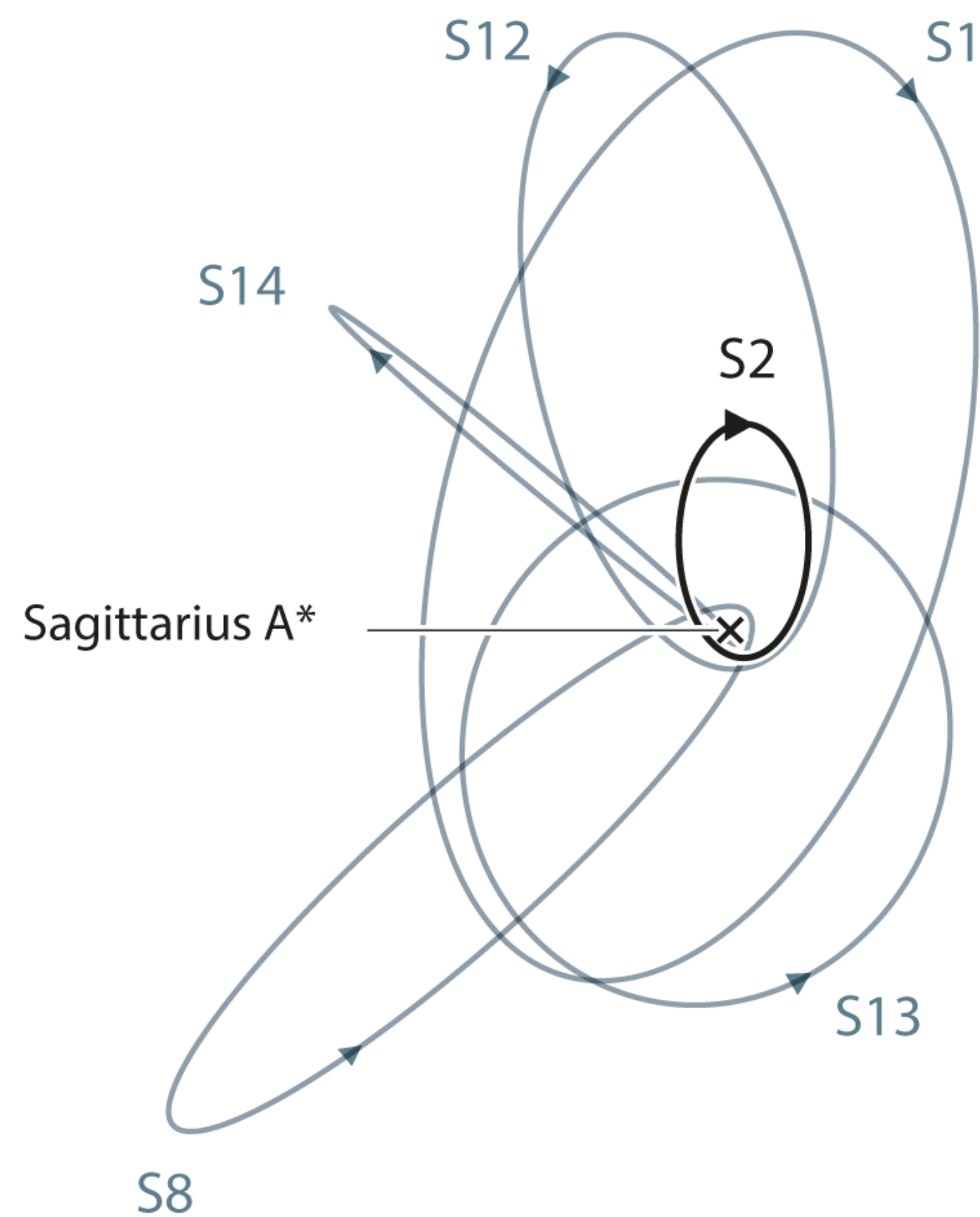
PHOTO: SUBARU, KECK AND NASA TELESCOPES. MAUNA KEA SUMMIT

## Searching the galaxy

Reinhard Genzel and Andrea Ghez have searched for a black hole at the centre of our galaxy, the Milky Way.



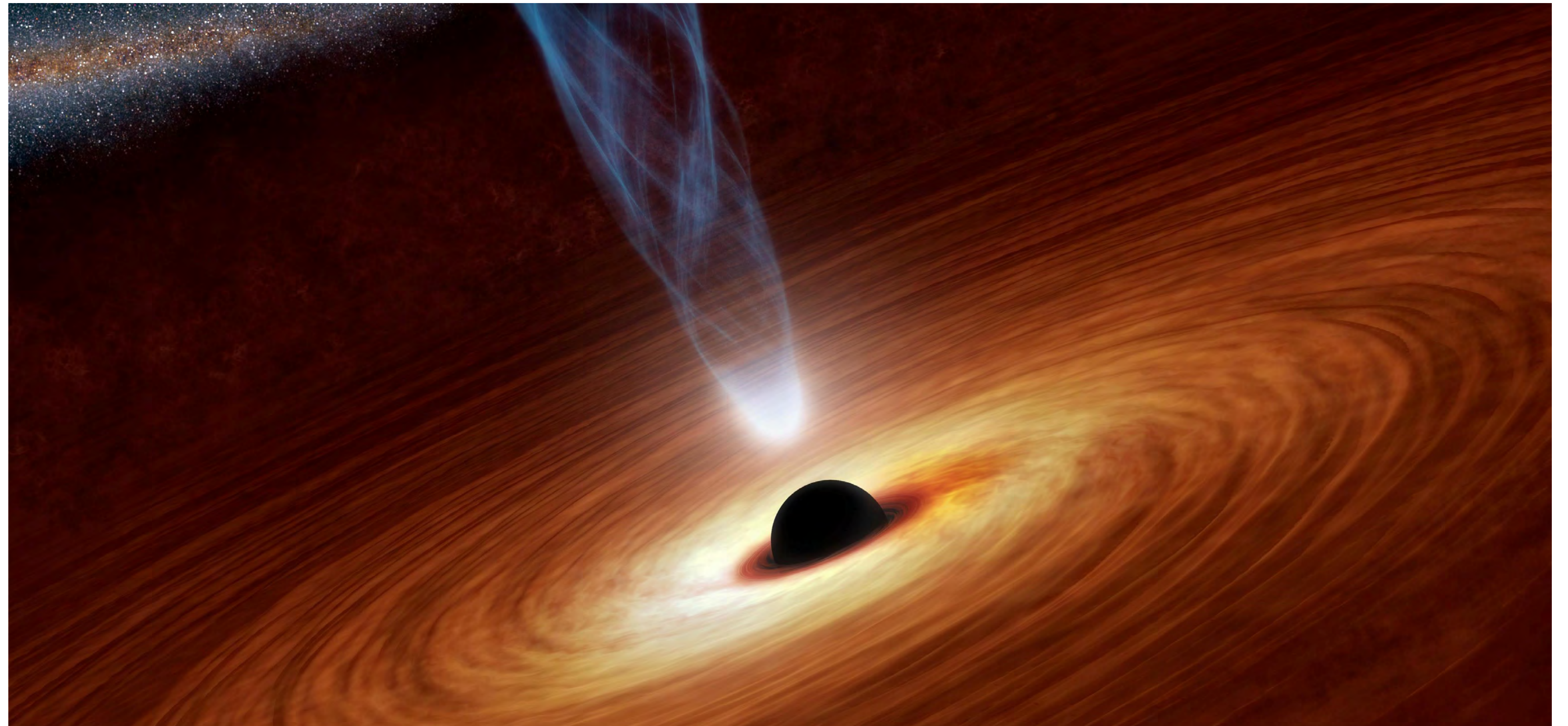
# Star orbits provide evidence



The orbital paths of stars make it possible to calculate whether or not they are moving around a black hole.

# Expected surprises?

Inside the “singularity” of the black hole, the currently accepted laws of physics do not work.





“It amazes me  
every time I go to  
the telescope.”

Andrea Ghez, 2020 Physics Laureate

THE  
NOBEL  
PRIZE

FOR THE GREATEST  
BENEFIT TO  
HUMANKIND

Nobel Prize Lessons