What's in a shadow? Past, Present and Future of Black Hole Imaging

Heino Falcke, Radboud University Nijmegen

The inside of black holes is shielded from observations by an event horizon, a virtual one-way membrane through which matter, light and information can enter but never leave. This loss of information, however, contradicts some basic tenets of quantum physics. Does such an event horizon really exist? What are its effects on the ambient light and surrounding matter? How does a black hole really look? Can one see it? Recently we have made the first image of a black hole and detected its dark shadow in the radio galaxy M87 with the global Event Horizon Telescope. Detailed supercomputer simulations faithfully reproduce these observations. Simulations and observations together provide strong support for the notion that we are literally looking into the abyss of the event horizon of a supermassive black hole. The talk will review the results of the Event Horizon Telescope, the nature and meaning of the black hole shadow, its scientific implications and future expansions of the array.

Short CV:

Heino Falcke received his PhD summa cum laude in 1994 from the University of Bonn. He was PostDoc at the Univ. Maryland, visiting professor at the Univ. of Arizona, staff scientist at the Max-Planck-Institut für Radioastronomie in Bonn and the Netherlands National Radio Astronomy institute ASTRON in Dwingeloo. Since 2007 he is full professor of astroparticle physics and radio astronomy at the Radboud University in Nijmegen, the Netherlands. He was one of the founders of the Event Horizon Telescope and chair of its science council until 2019. Falcke is member of the royal Netherlands academy for arts and science, recipient of the Spinoza price, the highest science award of the Netherlands, and of two European ERC grants. Recently he wrote the bestselling book "Light in the Darkness: black holes, the universe and us" about the first image of a black hole.
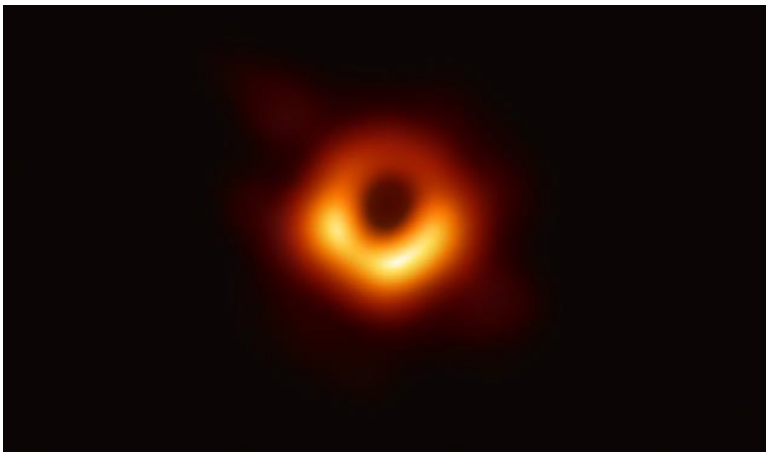
© EHT Collaboration   © Boris Breuer