

Hubble Spots Disk Around Distant Black Hole

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Using the Hubble space telescope, astronomers have captured a direct image of the disk surrounding a black hole.

The disk is made of gas and dust, slowly being consumed as it spirals down into the black hole's center. As it falls in, the material spews out a tremendous amount of energy, forming what is known as a quasi-stellar radio source, or quasar.

Among the brightest objects in the sky, quasars are short-lived phenomena that only existed during the earliest eras of the universe. They are known to be huge — most are around 60 billion miles across — yet they lie billions of light years from Earth, making them nothing but insignificant pinpricks in even the most powerful telescopes.

Hubble was able to image the distant disk, which is approximately 18.5 billion light-years away, because a huge galaxy happens to sit between Earth and the quasar. The mass of the enormous galaxy bent light from the quasar and directed it toward our telescopes, acting like a gigantic gravitational lens.

The technique allowed the Hubble telescope to see with unprecedented detail. Because of this, researchers were able to measure the disk's size — between 60 and 180 billion miles across — and determine the temperature of different parts of the disk. They found that gas and dust from the imaged quasar became bluer and therefore hotter as it fell toward the central black hole.

Update: Many of the commentors below have wondered how this quasar can be

18.5 billion light-years away when the universe is only 13.5 billion years old (and therefore nothing should be farther than the distance that light would travel in that time, namely 13.5 billion light-years). This is not a mistake. Though nothing traveling in the universe can move faster than light speed, the expansion of the universe itself can happen at any speed (including faster than light). Just one of the mind blowing facts about this strange universe we live in.

In the 13.5 billion years since the Big Bang, space has expanded so much that the farthest object we can detect are in fact more than 30 billion light years away. You can find out more about the quasar at this link and you can calculate distance to objects at high redshifts using this online calculator.

Image: NASA, ESA, J.A. Muñoz (University of Valencia)

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