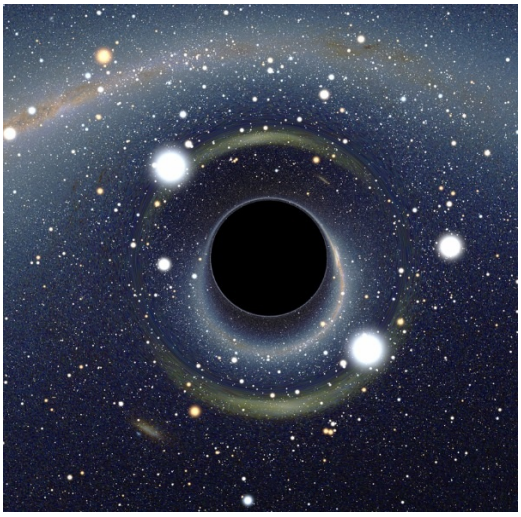
SCIENTISTS EXPECT DIRECT BLACK HOLE IMAGE SOON



Simulated view of a black hole in front of the Large Magellanic Cloud.

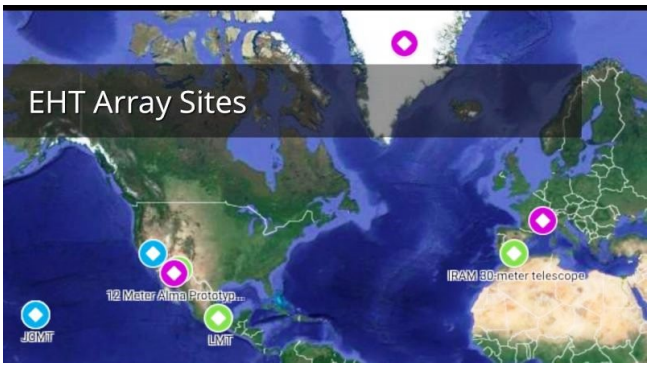
In late 2017, scientists with the Event Horizon Telescope – an international collaboration that's created a virtual Earth-sized telescope, with the goal of capturing the first direct image of a black hole – reported on a the long-awaited shipment of hard disk drives from the South Pole. They said they were busily analyzing the data on these drives, which is expected to be a key component in giving us the first-ever direct image of a black hole sometime in 2018. Now an article at news.com.au reported:

The data is in. The numbers are being crunched.

The Vox.com video above explains that nearly all images we see of black holes are artist's illustrations. The ones that aren't illustrations show, at best, the effects of black holes on the space around them – for example, stars in tightly bound orbits, gas heated to high temperatures, or relativistic jets.

So what are scientists with the Event Horizon Telescope expecting to see?

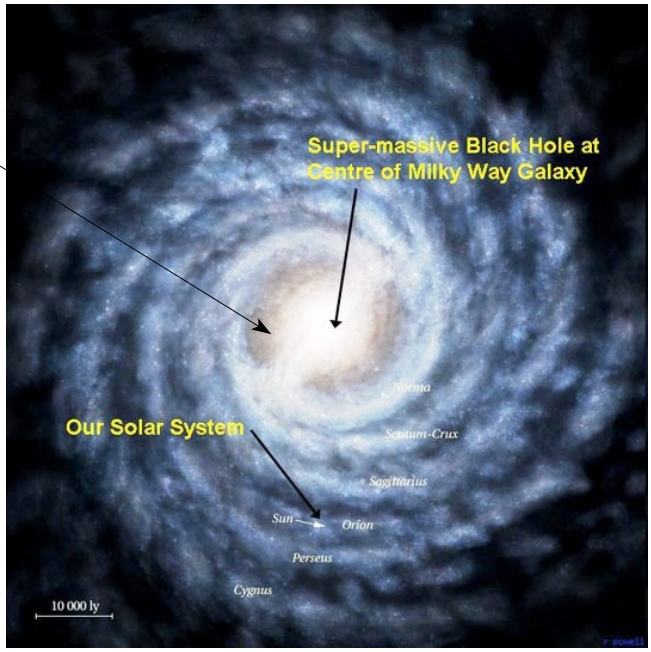
As most of us know, black holes are truly black. That is, they are regions containing so much mass squeezed into so little space – regions of such powerful gravity – that no information or light or anything can escape, even if moving at the fastest speed known to exist in our universe, the speed of light.



Sites of participating components of the Event Horizon Telescope.

Astronomers with the Event Horizon Telescope aren't aiming to capture the black nothingness of a black hole itself (that's not possible), but instead a black hole's event horizon, the sphere-like point-of-no-return surrounding a black hole.

Which black hole then? Naturally, they'll want to image the black hole that appears biggest from Earth. The first logical choice is Sagittarius A* – pronounced Sagittarius A-star – a 4-million solar-mass black hole located at the centre of our home galaxy, the Milky Way. This supermassive black hole is about 27,000 light-years from Earth.



The secondary target of the Event Horizon Telescope is much, much farther away, some 50-60 million light-years from Earth. It's the supermassive black hole at the center of M87: the largest galaxy in our home galaxy cluster, the Virgo cluster. How can it appear big to us, at such a great distance away? It contains over 6 billion solar masses. This black hole is so big it could swallow our solar system whole.

This historic image – the first direct image of a black hole's event horizon – will give scientists a chance to see what, until now, they've been able to explore only theoretically. An event horizon itself is, after all, just a theoretical construct. We don't know for sure event horizons actually exist (although, clearly, scientists are confident they do).

As **Ethan Siegel** asked in a comprehensive article on this subject: Will it appear as General Relativity predicts? There are some incredible things to test:

1. whether the black hole has the right size as predicted by general relativity
2. whether the event horizon is circular (as predicted), or oblate or prolate instead
3. whether the radio emissions extend farther than we thought, or
4. whether there are any other deviations from the expected behaviour.

What was once deemed "untestable" has suddenly become real.

AK, with EarthSky Notes