

## Key points from Lecture 21 of ASTR 350

1. The extremes of black holes means that by studying them we may be able to probe fundamental physics, e.g., we may be able to test whether Einstein's theory of gravity is correct. One reason to suspect that Einstein might not have the last word is that there is an incompatibility between general relativity and quantum mechanics, which describes the rest of the known forces.
2. The Event Horizon Telescope obtained radio data on the 6 billion solar mass black hole in the center of the massive elliptical galaxy M87, and also on the black hole in the center of our galaxy, but this has not yet been reported. The data don't form an image, but with reasonably guessing the team put together a likely image which made headlines a few years ago and is beautiful, if not well resolved!
3. In the "image" we see the shadow of a black hole. The shadow depends on the mass of the black hole, which confirms the known mass, and on complicated details of the properties of the matter around the hole, but not much on the spin of the hole.
4. The data do not yet constrain much about this system, i.e., we don't know more than we did before, but there are hopes that with better future data we might learn more.