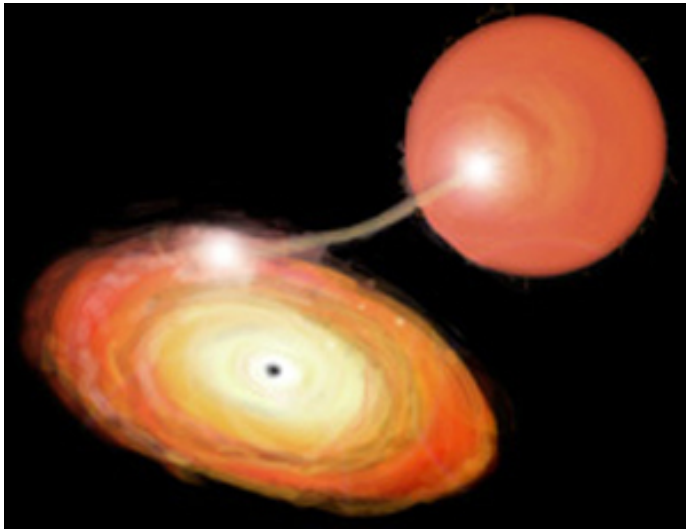


## Stellar Black Holes

Stellar black holes are located throughout our Galaxy. They are formed when a massive star explodes as a supernova.



Artist's concept of an X-ray binary.  
Source: HEASARC/NASA

Stellar black holes have between 3 - 20 times the mass of our Sun. They can't be seen directly, so to find black holes astronomers have to look for certain clues.

All the stellar black holes found to date have been discovered because they are orbiting a star. It is quite common for two stars to orbit each other in what is called a binary system. If a star is found to be orbiting an invisible object astronomers can study the motion of the visible star to determine if the invisible object has enough mass to be a black hole or if it is simply a star that is too faint to see.

The best way to look for binary systems that might contain a black hole is to use an X-ray telescope. X-rays are produced by material that is heated to temperatures of over 100 million degrees Celsius. Such conditions occur near a black hole. As a stellar black hole orbits a star it strips gas off the surface of the star. This gas circles around the edge of the black hole, forming an accretion disk. The gas which is closer to the black hole spins faster than the gas at the edge of the accretion disk. This creates friction within the disc and temperatures soar to over 100 million degrees Celsius and the gas emits X-rays.

X-ray satellites have been used to identify nine potential stellar black holes. The first, Cygnus X-1, was discovered in the early 1970's and is still the most promising black hole candidate, with a predicted size of at least 6 solar masses.