



RESEARCH

VIRGO AND LIGO DISCOVER NEW AND UNEXPECTED BLACK HOLE POPULATIONS

The Virgo and LIGO gravitational wave interferometers have observed the fusion of two black holes of 66 and 85 solar masses, which generated a final black hole of approximately 142 solar masses, a black hole of "intermediate mass" (as black holes of mass between hundreds and hundreds of thousands of solar masses are called). No black hole of this type has ever been observed before with gravitational waves or electromagnetic radiation; its observation can therefore provide useful information to explain the formation of supermassive black holes, giants millions of times heavier than the Sun, which could result from the fusion of black holes of intermediate mass. Moreover, the most massive observed black hole challenges our understanding of the mechanisms of black hole formation: based on current models, a black hole of 85 solar masses cannot be formed by the collapse of a massive star. This detection therefore opens up new perspectives in the study of massive stars and supernovae mechanisms.

The distance of the source that produced the gravitational wave signal, detected by the three interferometers of the global network on 21 May 2019 and called GW190521, was estimated to be approximately 17 billion light years. Two scientific articles, describing the discovery and its astrophysical implications, were published on September 2, in Physical Review Letters and Astrophysical Journal Letters, respectively. ■