

Dear Friends,

At this very moment two simultaneous press conferences are under way in Cascina, Pisa, Italy (streaming broadcast www.virgo-gw.eu), and Washington DC, USA, where the LIGO-VIRGO Collaboration is about to make the following historical announcement:

On September 14, 2015 at 09:50:45 UTC the two detectors of the Laser Interferometer Gravitational-wave Observatory (LIGO) simultaneously observed a transient gravitational-wave signal. The signal sweeps upwards in frequency from 35 Hz to 250 Hz with a peak gravitational-wave strain of $1.0 \cdot 10^{-21}$. It matches the waveform predicted by general relativity for the inspiral and merger of a pair of black holes and the ring-down of the resulting single black hole. The signal was observed with a matched filter signal-to-noise ratio of 24 and a false alarm rate estimated to be less than 1 event per 202,600 years, equivalent to a significance greater than 5.1σ . The source lies at a luminosity distance of 410^{+160}_{-180} Mpc corresponding to a redshift $z = 0.09^{+0.03}_{-0.04}$. In the source frame, the initial black hole masses are $36^{+5}_{-4} M_{\odot}$ and $29^{+4}_{-4} M_{\odot}$, and the final black hole mass is $62^{+4}_{-4} M_{\odot}$, with $3.0^{+0.5}_{-0.5} M_{\odot} c^2$ radiated in gravitational waves. All uncertainties define 90% credible intervals. These observations demonstrate the existence of binary stellar-mass black hole systems. This is the first direct detection of gravitational waves and the first observation of a binary black hole merger.

For more info please click on the links below

LIGO web-site <https://ligo.caltech.edu/>

VIRGO web-site <https://www.virgo-gw.eu/>

Phys. Rev. Lett. <http://journals.aps.org/prl/>

Please feel free to circulate the present email among students and colleagues at UNICAM.

Ciao,

Fabio