WEYMOUTH ASTRONOMY

Sky Watcher

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Trips / Events

Ideas for trips and events always welcome!

events@weymouthastronomy.co.uk

- *9 Apr BNSS—Exoplanets—Don Pollacco*
- *20 Apr CADAS—Names in the Sky—Bob Mizon*
- *3 May WAS—Images of the Universe Vol 2—Paul Money*
- *17 May BNSS—Pluto from Myth to Discovery—Graham Bryant*
- *18 May CADAS—Yet More APODs—Bob Mizon*
- *4 June BNSS—Rosetta—Kim Birkett*
- *7 June WAS—Open Evening with Jo Richardson & Space Detectives*
- *15 June CADAS—Ask the Experts Evening*
- *5 July WAS—Dawn, Rosetta and New Horizons—Robin Catchpole*

If you are interested in giving a talk or workshop, let the organisers know. They like to offer new titles in their programme line-up.

More events to come!!

WAC Upcoming Events:

13 May—The Names of Stars—Bob Mizon

10 June—Ask the Experts!

8 July—Indonesian Eclipse—Chris Bowden

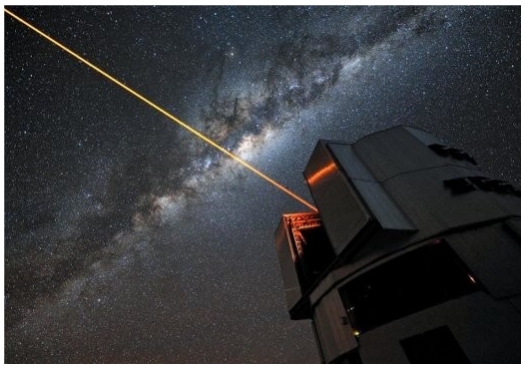
12 Aug—Club Public Open Evening at SACC

9 Sept—How Astronomy has Changed—Lillian Hobbs

More to come!

Plans for informal viewing nights will take place after the monthly meetings, weather permitting.

WAC News—



On the news recently I spotted a headline which would make Captain Kirk grin with pride, 'Laser cloaking device could help hide us from aliens'. It was not an April fools I discovered but a bona fide submission to the Monthly Notices of the Royal Astronomical Society. Essentially, two astronomers proposed that it could be possible to use lasers to mask the solar transit by Earth thereby keeping us hidden from alien discovery. This is not as far fetched as it sounds since we have no idea if alien life forms may be hostile and if they may be on the look out for water worlds with other desirable resources in the habitable zone of a nearby star. What are your thoughts on the topic? https://www.sciencedaily.com/releases/2016/03/160331105930.htm Until next month~SK

Gravitational Wave Astronomy Will Be The Next Greatest Scientific Frontier By Ethan Siegel

Imagine a world very different from our own: permanently shrouded in clouds, where the sky was never seen. Never had anyone see the Sun, the Moon, the stars or planets, until one night, a single bright object shone through. Imagine that you saw not only a bright point of light against a dark backdrop of sky, but that you could see a banded structure, a ringed system around it and perhaps even a bright satellite: a moon. That's the magnitude of what LIGO (the Laser Interferometer Gravitational-wave Observatory) saw, when it directly detected gravitational waves for the first time.

An unavoidable prediction of Einstein's General Relativity, gravitational waves emerge whenever a mass gets accelerated. For most systems -- like Earth orbiting the Sun -- the waves are so weak that it would take many times the age of the Universe to notice. But when very massive objects orbit at very short distances, the orbits decay noticeably and rapidly, producing potentially observable gravitational waves. Systems such as the binary pulsar PSR B1913+16 [the subtlety here is that binary pulsars may contain a single neutron star, so it's best to be specific], where two neutron stars orbit one another at very short distances, had previously shown this phenomenon of orbital decay, but gravitational waves had never been directly detected until now.

When a gravitational wave passes through an objects, it simultaneously stretches and compresses space along mutually perpendicular directions: first horizontally, then vertically, in an oscillating fashion. The LIGO detectors work by splitting a laser beam into perpendicular "arms," letting the beams reflect back and forth in each arm hundreds of times (for an effective path lengths of hundreds of km), and then recombining them at a photodetector. The interference pattern seen there will shift, predictably, if gravitational waves pass through and change the effective path lengths of the arms. Over a span of 20 milliseconds on September 14, 2015, both LIGO detectors (in Louisiana and Washington) saw identical stretching-and-compressing patterns. From that tiny amount of data, scientists were able to conclude that two black holes, of 36 and 29 solar masses apiece, merged together, emitting 5% of their total mass into gravitational wave energy, via Einstein's $E = mc^2$.

During that event, more energy was emitted in gravitational waves than by all the stars in the observable Universe combined. The entire Earth was compressed by less than the width of a proton during this event, yet thanks to LIGO's incredible precision, we were able to detect it. At least a handful of these events are expected every year. In the future, different observatories, such as NANOGrav (which uses radiotelescopes to the delay caused by gravitational waves on pulsar radiation) and the space mission LISA will detect gravitational waves from supermassive black holes and many other

Gravity Waves(continued)

sources. We've just seen our first event using a new type of astronomy, and can now test black holes and gravity like never before.

Read more on the subject at https://www.ligo.caltech.edu/news/ligo20160211

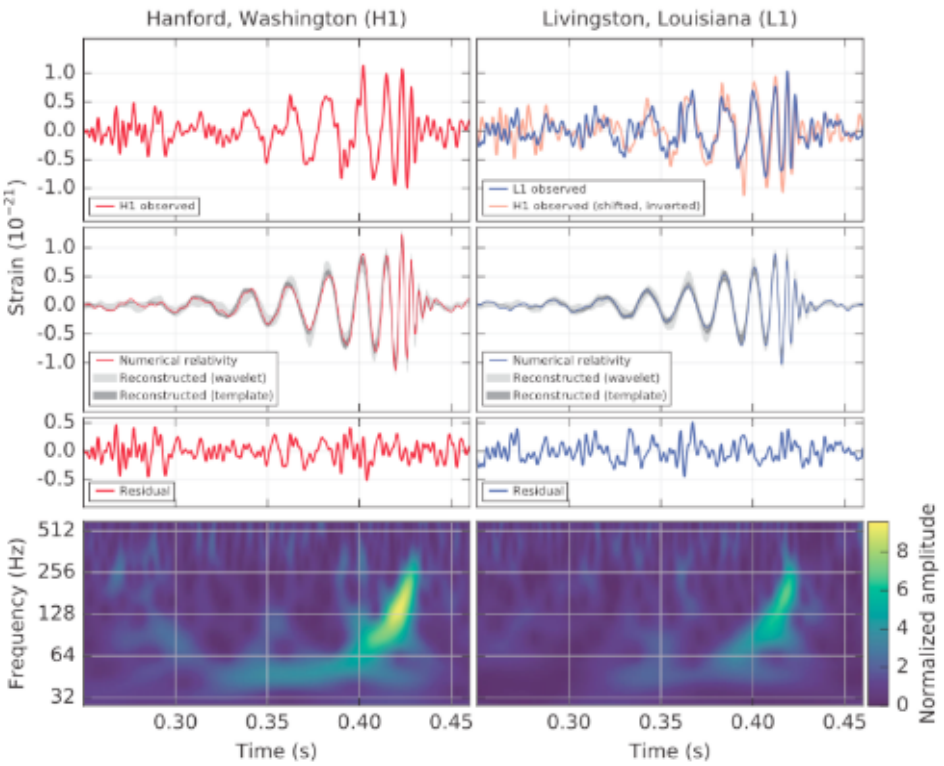


Image credit: Observation of Gravitational Waves from a Binary Black Hole Merger B. P. Abbott et al., (LIGO Scientific Collaboration and Virgo Collaboration), Physical Review Letters 116, 061102 (2016). This figure shows the data (top panels) at the Washington and Louisiana LIGO stations, the predicted signal from Einstein's theory (middle panels), and the inferred signals (bottom panels). The signals matched perfectly in both detectors.

Member Featured Image

This month features a lovely widefield image by Tim Lainsbury. The image is very well balanced between the foreground interest of a lovely palm tree and the gradient twilight sky darkening to reveal the constellation Auriga the Charioteer in the South and part of Gemini the Twins to the Southeast.. This is a superb example of now the terrestrial and the celestial can be photographed together.

We look forward to more inspiring images from Tim in the future.