WEYMOUTH ASTRONOMY

Trips / Events

Ideas for trips and events always welcome!

events@weymouthastronomy.co.uk

May 15 CADAS—Ask the Panel

June 4 WAS—Galaxy Evolution by Dr Chris Pearson

June 19 CADAS—The Story of Radio Astronomy by James Fradgley

July 2 WAS—Comets by Robert Miles

July 17 CADAS—Narrow-band Imaging: Pros and Cons by Bill Reed

Aug 6 WAS—T'ant Rocket Science by Bud Budzinsky

Aug 21 CADAS—Gadgets and Gizmos Evening

Programmes for many other UK Astronomical Societies will be available in the near future. Check their websites for more details.

The events for the British Astronomical Society (BAA) can be found at https://britastro.org/meetings/2019

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.

WAC Upcoming Events:

June 14 Ennio Tabone - Introduction to Telescopes and Observing

July—August Summer Break

Sept 13 Open Evening

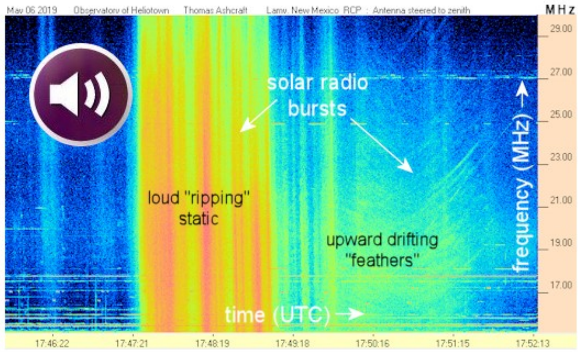
Why don't you volunteer to give a short talk? What part of astronomy inspires you? Pick a favourite object to speak on perhaps.

More to come!!

Sky Watcher

Volume 13, Issue 12
10 May 2019

WAC News—Spaceweather.com 7 May, 2019:



RARE SOLAR RADIO BURST: Last month, sunspot AR2740 strafed Earth with loud shortwave radio bursts. It's doing it again. "Yesterday, May 6th, was an incredible day of strong solar radio bursts including one of the strongest of the current solar cycle," reports Thomas Ashcraft who recorded the outburst with a shortwave radio telescope in New Mexico. *The audio file can be played from the website article.* It is a stereo recording with 20 MHz in one channel and 25 MHz in the other.

How does a sunspot make radio waves? It starts with a solar flare. Beams of electrons accelerated by flares slice through the sun's atmosphere, creating a ripple of plasma waves and radio static detectable on Earth 93 million miles away. Astronomers classify solar radio bursts into five types; Ashcraft's recording captured a mixture of Type III and Type V. And something else... Ashcraft has been recording solar radio bursts for many years. Yesterday he picked up something new. "In the dynamic spectrum, note the 'feathery' upward drifting radio emissions," he says. "I've never seen anything like that--not even during solar maximum. This is auspicious and rare activity to be happening during the deepest time of solar minimum."

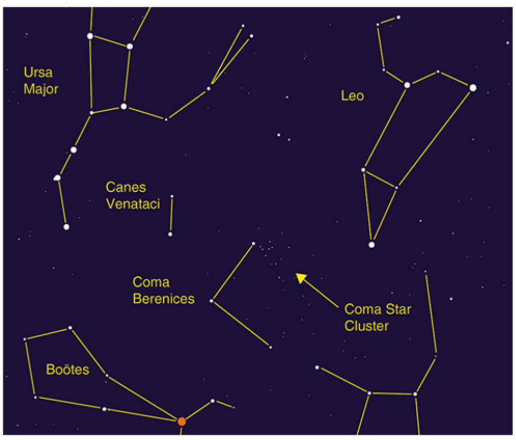
If you would like to detect solar radio bursts in your own backyard, order a radio telescope kit from NASA's RadioJOVE project. Until next month ~SK

Watching the Late Spring Skies

by David Prosper

Late spring brings warmer nights, making it more comfortable to observe a good showing of the **Eta Aquarids** meteor shower. Skywatchers can also look for the delicate **Coma Star Cluster**, and spot the **Moon** on the anniversary of **Apollo 10**'s "test run" prior to the Moon landing in 1969.

The **Eta Aquarids** meteor shower should make a good showing this year, peaking the morning of May 6. This meteor shower has an unusual "soft peak," meaning that many meteors can be spotted several days before and after the 6th; many may find it convenient to schedule meteor watching for the weekend, a night or two before the peak. You may be able to spot a couple dozen meteors an hour from areas with clear dark skies. Meteors can appear in any part of the sky and you don't need any special equipment to view them; just find an area away from lights, lie down on a comfy lawn chair or blanket, relax, and patiently look up. These brief bright streaks are caused by Earth moving through the stream of fine dust particles left by the passage of Comet Halley. While we have to wait another 43 years for the famous comet grace our skies once more, we are treated to this beautiful cosmic postcard every year.

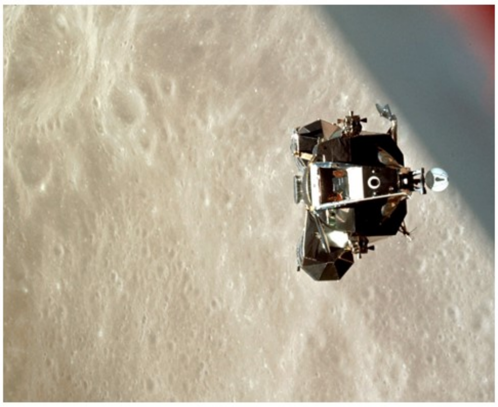


Try to spot the Coma Star Cluster! Image created with assistance from Stellarium

While you're up meteor watching, try to find a delightful naked eye star cluster: the **Coma Star Cluster** (aka Melotte 111) in the small constellation of Coma Berenices. It can be spotted after sunset in the east and for almost the entire night during the month of May. Look for it inside the area of the sky roughly framed between the constellations of Leo, Boötes, and Ursa Major. The cluster's sparkly members are also known as "Berenice's Hair" in honor of Egyptian Queen Berenices II's sacrifice of her lovely tresses. Binoculars will bring out even more stars in this large young cluster.

May marks the 50th anniversary of the Lunar Module's test run by the **Apollo 10** mission! On May 22, 1969, NASA astronauts Thomas Safford and Eugene Cernan piloted the Lunar Module - nicknamed "Snoopy" - on a test descent towards the lunar surface. Undocking from "Charlie Brown" - the Command Module, piloted by John Young – they descended to

Mars the Wanderer (more!)



47,400 feet above the surface of the Moon before returning safely to the orbiting Command Module. Their success paved the way for the first humans to land on the Moon later that year with Apollo 11. Look for the Moon on the morning of May 22, before or after dawn, and contemplate what it must have felt like to hover mere miles above the lunar surface. You'll also see the bright giant planets Saturn and Jupiter on either side of the Moon before sunrise. When will humans travel to those distant worlds?

A view of Apollo 10's Lunar Module from the Command Module as it returned from maneuvers above the lunar surface.
Photo Credit: NASA
Source: http://bit.ly/apollo10view

Theorist calculates the incalculable siren song of merging black holes

Science

By Adrian Cho

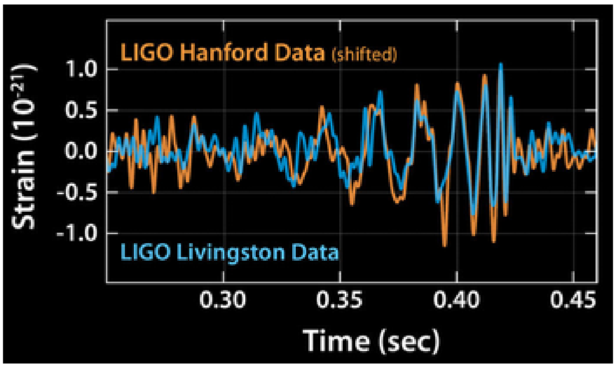
Just a month into a renewed observing campaign with a trio of detectors, physicists today announced they have spotted more gravitational waves—fleeting ripples in space set off when two massive objects such as black holes spiral into each other. The collaboration has now bagged 13 merging black hole pairs, as well as two pairs of neutron stars. But even as detections accumulate, one theorist has made an advance that could change how the team analyzes the signals and make it easier to test Albert Einstein's theory of gravity, general relativity.

To interpret their signals gravitational wave hunters compare them to computer simulations. Now, Sean McWilliams, a theoretical astrophysicist at West Virginia University in Morgantown, has calculated an exact mathematical formula for the signal, or waveform, produced by two merging black holes.

As two black holes spiral ever closer, they emit ripples in space that speed up. The waves' intensity peaks as the two objects collide, and then peter out as the final, merged black hole undulates and settles down. To decipher the signal and determine the black holes' masses and other parameters, scientists compare it to a catalog of simulated signals, a tack they have taken because of the complexity of the problem. According to general relativity, gravity arises when mass and energy warp spacetime. And a black hole is the ultraintense gravitational field left behind when a massive star collapses to an infinitesimal point. So when two black holes swirl together, warping begets warping and renders the mathematics "nonlinear" and intractable. Or so many scientists assumed. McWilliams says he has found a way to calculate the signal mathematically after all, as he reports in a paper in press at *Physical Review Letters*.

The calculation involves special distances from the center of the black hole. Famously, nothing can escape a black hole if it draws closer than a characteristic distance called the event horizon. At a distance about 1.5 times that of the event horizon, the black hole's gravity will bend passing light into a circular orbit, defining the "light ring." A distance roughly three times that of the event horizon marks the limit for a massive object to maintain a circular orbit and not spiral in, a threshold called the innermost stable circular orbit (ISCO).

Previous attempts to calculate the exact waveform from a black hole merger relied on a standard mathematical transformation, turning the problem of two orbiting black holes into one of a single body spiraling in a funnel-shaped energy landscape. But within the ISCO, the body stops spiraling, forcing researchers to correct its path with numerical simulations. McWilliams realized he could avoid that problem by skipping to the final merged black hole. He then used general relativity to calculate how a tiny test mass spirals into and perturbs the final black hole, enabling him to calculate the radiated signal from the ISCO inward.



Two relatively simple formulas describe the peak and reverberation of gravitational wave signals like the first ones the Laser Interferometer Gravitational-Wave Observatory saw. CALTECH/MIT/LIGO LAB

Once the test particle reaches the light ring, tracing its trajectory becomes mathematically untenable. But McWilliams says the physics there can be ignored for a simple reason: All the churning of spacetime within the light ring cannot escape to influence the spreading gravitational waves. Essentially, the black hole itself slurps up all the nasty nonlinearities. McWilliams provides a pair of formulas that neatly match the simulations. "I'll be honest," he says, "I was rather floored how well it agrees with the results of numerical relativity."

Read the full article at:
https://www.sciencemag.org/news/2019/05/theorist-calculates-incalculable-siren-song-merging-black-holes