WEYMOUTH ASTRONOMY

Sky Watcher

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Trips / Events

Ideas for trips and events always welcome!

events@weymouthastronomy.co.uk

Society Meetings cancelled until further notice—Please check their websites for the latest schedule

In the meantime, the British Astronomical Association has moved their meetings to an online format. Live streamed on release and 'catch-up' on Youtube available. These webinars are Open to All.

https://britastro.org/

BAA live webinars, 7pm every Wednesday

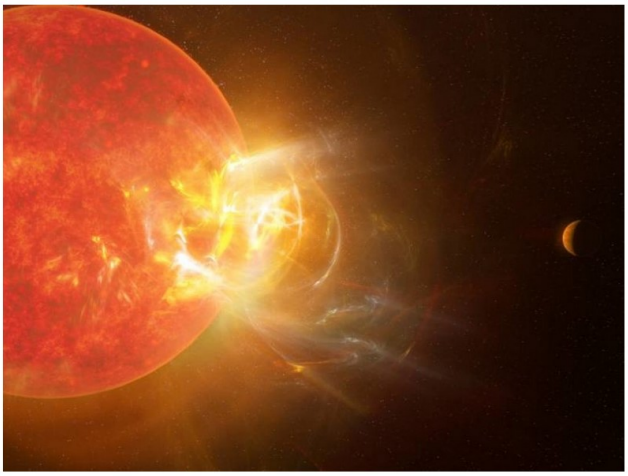
https://www.youtube.com/user/britishastronomical

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:

	Watch website for online options.
12/13 Aug	**Members Viewing Evening for the Perseid Meteors and Summer Constellations. From 10:00pm - Contact Weymouth Astronomy Club for further details.**
10 Sept	**Open Evening**
8 Oct	**David Strange - Historic Observation of Mars**

Space Weather—Near and Stars away…



An enormous stellar flare erupts from Proxima Centauri in this artist's representation. Credit: S. Dagnello, NRAO/AUI/NSF

Not only are we concerned about spaceweather from our Sun, astrophysicists are now beginning to understand the power of spaceweather events on nearby stars. A recent article in EOS discusses, 'Proxima Centauri recently let loose a blast of radiation, and ground- and space-based telescopes detected the record-setting event at wavelengths ranging from radio to the ultraviolet.' The power of flaring activity measurable on our cosmic neighbour is indeed worthy of interest. The full article and journal reference link can be found at: https://eos.org/articles/record-setting-flare-spotted-on-the-nearest-star-to-the-sun?mkt_tok=OTg3LUlHVC01NzIAAAF9UWfDrprhLlW5FSpv5lYvM02PBh8trfhXKFNoQ8SilxTqShe-zVPXoYj9tDf2y9aOHBZcj1p5hxQmbMHiEBviSDQDsziqXfEoGFKDH8

Hope you all have a relaxing summer break.

Until next time… SL Karl

Observe the Milky Way and Great Rift

by David Prosper

Summer skies bring glorious views of our own Milky Way galaxy to observers blessed with dark skies. For many city dwellers, their first sight of the Milky Way comes during trips to rural areas - so if you are traveling away from city lights, do yourself a favor and look up!

To observe the Milky Way, you need clear, dark skies, and enough time to adapt your eyes to the dark. Photos of the Milky Way are breathtaking, but they usually show far more detail and color than the human eye can see – that's the beauty and quietly deceptive nature of long exposure photography. For Northern Hemisphere observers, the most prominent portion of the Milky Way rises in the southeast as marked by the constellations Scorpius and Sagittarius. Take note that, even in dark skies, the Milky Way isn't easily visible until it rises a bit above the horizon and the thick, turbulent air which obscures the view. The Milky Way is huge, but is also rather faint, and our eyes need time to truly adjust to the dark and see it in any detail. Try not to check

The Great Rift is shown in more detail in this photo of a portion of the Milky Way along with the bright stars of the Summer Triangle. You can see why it is also called the "Dark Rift." Credit: NASA / A.Fujii

Milky Way (more!)

your phone while you wait, as its light will reset your night vision. It's best to attempt to view the Milky Way when the Moon is at a new or crescent phase; you don't want the Moon's brilliant light washing out any potential views, especially since a full Moon is up all night.

Keeping your eyes dark adapted is especially important if you want to not only see the haze of the Milky Way, but also the dark lane cutting into that haze, stretching from the Summer Triangle to Sagittarius. This dark detail is known as the Great Rift, and is seen more readily in very dark skies, especially dark, dry skies found in high desert regions. What exactly is the Great Rift? You are looking at massive clouds of galactic dust lying between Earth and the interior of the Milky Way. Other "dark nebulae" of cosmic clouds pepper the Milky Way, including the famed Coalsack, found in the Southern Hemisphere constellation of Crux. Many cultures celebrate these dark clouds in their traditional stories along with the constellations and Milky Way.

If the Milky Way was shrunk down to the size of North America, our entire Solar System would be about the size of a quarter. At that scale, the North Star, Polaris - which is about 433 light years distant from us - would be 11 miles away! Find more ways to visualize these immense sizes with the Our Place in Our Galaxy activity: bit.ly/galaxyplace

Where exactly is our solar system within the Milky Way? Is there a way to get a sense of scale? The "Our Place in Our Galaxy" activity can help you do just that, with only birdseed, a coin, and your imagination: bit.ly/galaxyplace. You can also discover the amazing science NASA is doing to understand our galaxy – and our place in it - at nasa.gov.

Juno Detects Jupiter's Highest-Energy Ions

EOS

—Morgan Rehnberg, Science Writer

Jupiter's planetary radiation environment is the most intense in the solar system. NASA's Juno spacecraft has been orbiting the planet closer than any previous mission since 2016, investigating its innermost radiation belts from a unique polar orbit. The spacecraft's orbit has enabled the first complete latitudinal and longitudinal study of Jupiter's radiation belts. *Becker et al.* leverage this capability to report the discovery of a new population of heavy, high-energy ions trapped at Jupiter's midlatitudes.

The authors applied a novel technique for detecting this population; rather than using a particle detector or spectrometer to observe and quantify the ions, they used Juno's star-tracking camera system. Star trackers, or stellar reference units (SRUs), are high-resolution navigational cameras whose primary mission is using observations of the sky to compute the spacecraft's precise orientation. The SRU on board the Juno spacecraft is among the most heavily shielded components, afforded 6 times more radiation protection than the spacecraft's other systems in its radiation vault.

This animation shows the Juno spacecraft's stellar reference unit (SRU) star camera (left) as it is hit by high-energy particles in Jupiter's inner radiation belts. The signatures from these hits appear as dots, squiggles, and streaks (right) in the images collected by the SRU. Credit: NASA/JPL-Caltech

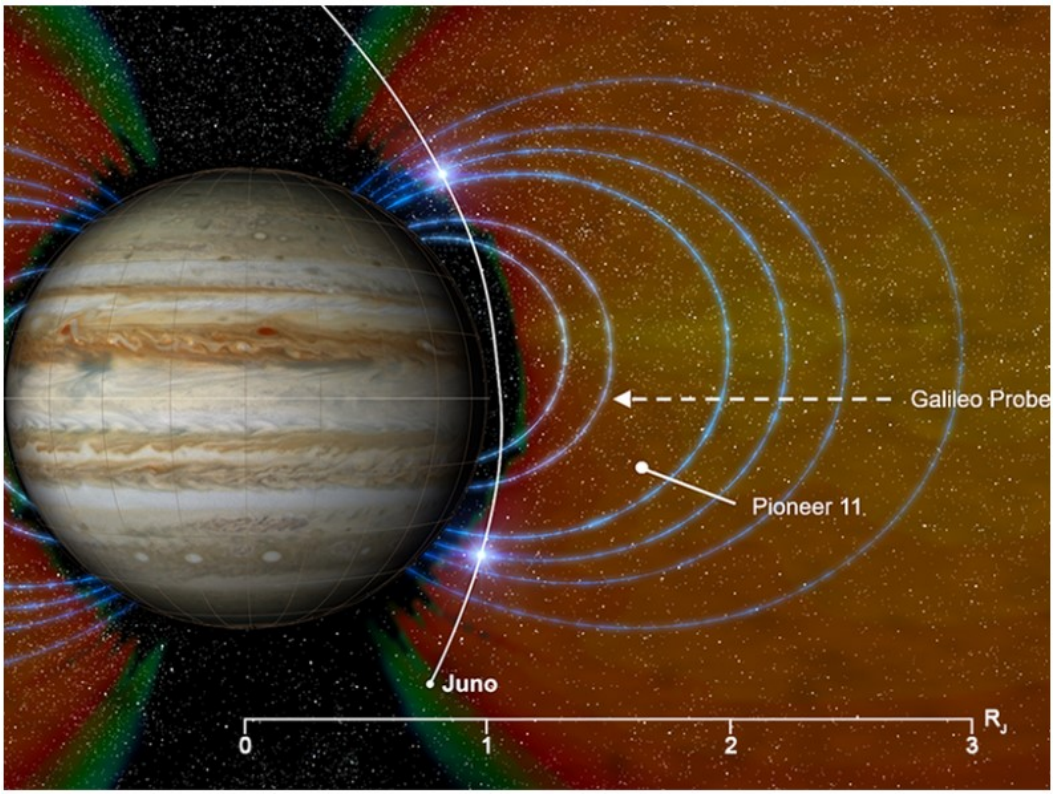
Despite its heavy protection, ions and electrons with very high energies still occasionally penetrate the shielding and strike the SRU sensor. This study focuses on 118 unusual events that struck with dramatically higher energy than typical penetrating electrons. Using computer modeling and laboratory experiments, the authors determined that these ions deposited 10 and 100 times more energy than deposited by penetrating protons and electrons, respectively.

To identify potentially responsible ion species, the authors examined the morphology of the sensor strikes. Although most strikes trigger only several pixels, a few events with a low incidence angle can create streaks in which energy is deposited as the particle penetrates successive pixels. Simulation software can predict the energy deposition of various particles moving through matter,

Jupiter (more!)

providing candidates for the ions encountered by Juno. Ion species as light as helium or as heavy as sulfur could account for at least some of the observed strikes, the authors said. Species from helium through oxygen could account for all the strikes, provided they have energies in excess of 100 megaelectron volts per nucleon.

Finally, the study attributes these ions to the inner edge of the synchrotron emission region, located at radial distances of 1.12–1.41 Jupiter radii and magnetic latitudes ranging from 31° -to 46°. This region has not been explored by prior missions, and this population of ions was previously unknown. With total energies measured in gigaelectron volts, they represent the highest-energy particles yet observed by Juno. (*Journal of Geophysical Research: Planets*, https://doi.org/10.1029/2020JE006772, 2021).

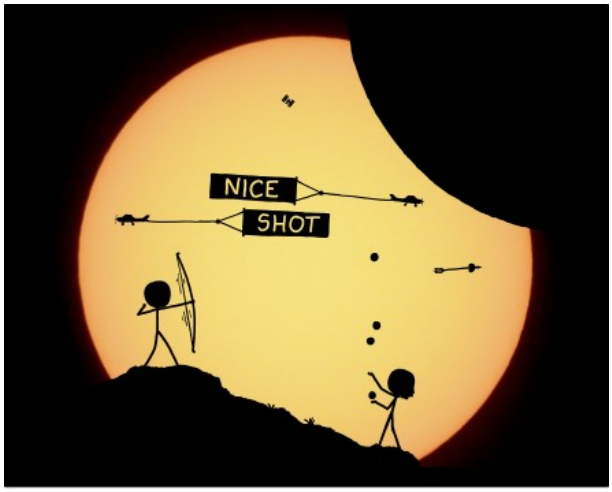


Juno has discovered a new population of highly energetic ions (bright blue spots) at midlatitudes within the inner edge of Jupiter's relativistic electron belt, a region not previously explored. Juno's stellar reference unit star camera records bright streaks in its images when these penetrating ions strike its sensor. The closest approach of Pioneer 11 to the planet and the path of the Galileo probe are also shown. Credit: M. Stetson, D. Santos-Costa, J. Arballo, H. N. Becker, CC BY-NC 4.0

On the lighter side...

Sun halo - 30 June 2021 taken with a mobile phone (LG V50) - SL Karl

https://imgs.xkcd.com/comics/astrophotography.png



OUR ASTROPHOTOGRAPHY COMMUNITY'S ONE-UPSMANSHIP IS GETTING OUT OF HAND.