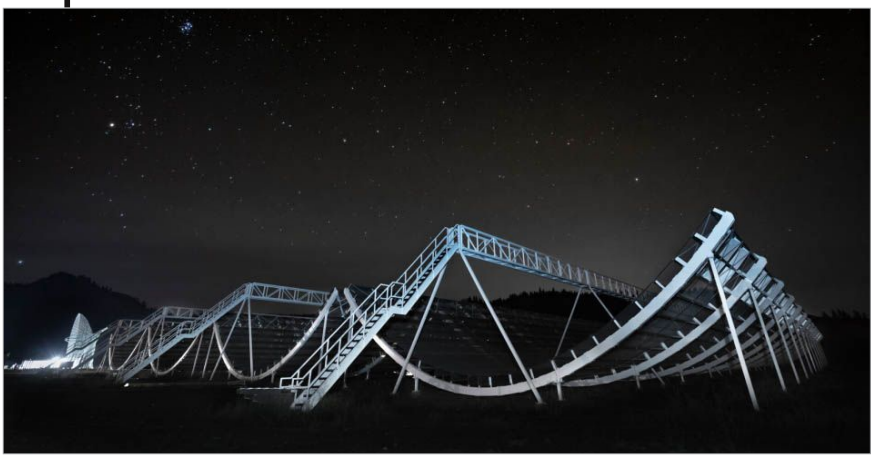
INSTITUTE OF ASTRONOMY
PUBLIC OPEN EVENING

— 12 February 2020 —

Fast Ray Burst seems to repeat itself



The Canadian Hydrogen Intensity Mapping Experiment Fast Radio Burst Project, which found the strange new FRB

Fast Ray Bursts remain one of the strangest (and hardest to explain) of all astrophysical phenomena. These brief pulses of radio energy were only discovered in 2007, and only a few dozen have been found to date. It wasn't until 2019 that astronomers were able to pinpoint the host galaxy of an FRB. Most FRBs happen once -- very fast -- and never again, making them very difficult to track down!

So what are these strange bursts? They have to originate from something small (as the bursts only last a few milliseconds), and events like energetic supernovae and merging neutron stars have been suggested as the cause. During the brief outpouring of energy, a FRB can release as much energy as millions of Suns,

A new discovery, however, makes most of these possible mechanisms seem unlikely.

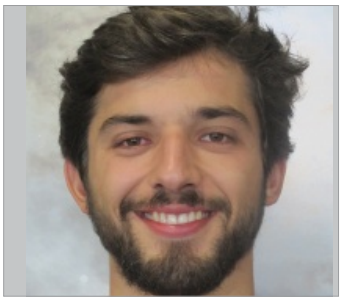
The Canadian Hydrogen Intensity Mapping Experiment Fast Radio Burst Project (CHIME/FRB) spotted a FRB, known as FRB180916.J0158+65 back in 2019. But a new paper has found that FRB 180916.J0158+65 goes through a regular 16-day cycle of bursts. For four days, the object is very active, blasting out radio waves almost every hour. Then, it enters a 12-day dormant period. Then the cycle repeats.

So far, astronomers have no explanation for what this pattern means! All we know is that these new observations are incompatible with current explanations for FRBs.

The team are optimistic that this new result could provide an important clue to the nature of these objects.

Read the paper here: https://arxiv.org/pdf/2001.10275.

TONIGHT'S SPEAKER



Anton Baleato

Gravitational lensing: a window to the invisible Universe

Our weekly welcome

WELCOME to our weekly public open evenings for the 2019/20 season. Each night there will be a half-hour talk which begins promptly at 7.15pm. Please note that the talk will be recorded and archived for online streaming.

The talk is followed by an opportunity to observe if (and only if!) the weather is clear. The IoA's historical Northumberland and Thorrowgood telescopes, along with our modern 16-inch telescope, will be open for observations. In addition, the Cambridge Astronomical Association will provide a floorshow outdoors on the Observatory lawns, relaying live images from their telescopes and providing a commentary. If we're unlucky and it's cloudy, we'll offer you a conciliatory cup of tea after the talk (with perhaps some more astro-information in the lecture theatre for those who want to stay on).

If you have any questions, suggestions or comments about the IoA Open Evenings please contact Matt Bothwell at bothwell@ast.cam.ac.uk.

The talk schedule for this term can be viewed at: www.ast.cam.ac.uk/public

Astronomers Voice Concerns About Starlink

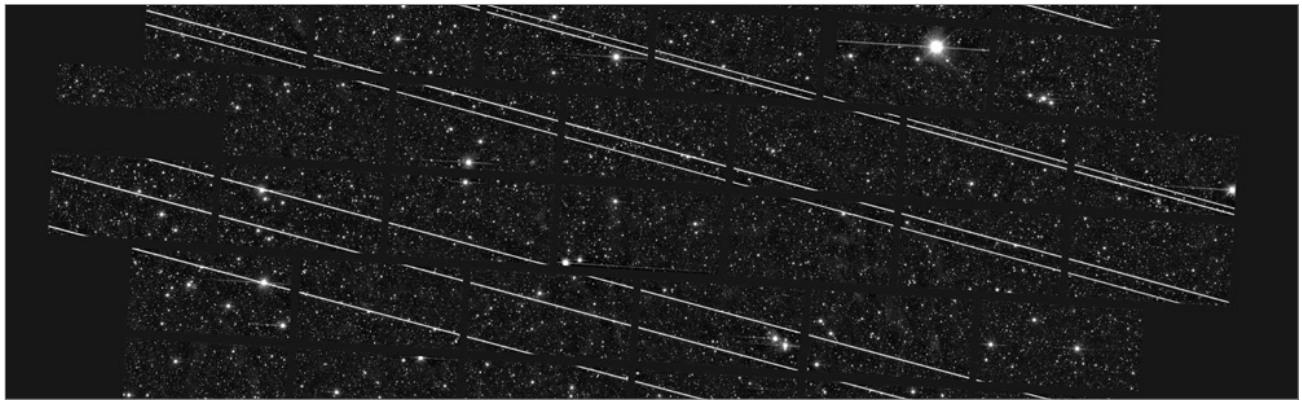


Image taken with the Dark Energy Camera as part of the DELVE survey (which is mapping the outskirts of the Magellanic Clouds). Nineteen Starlink satellite trails crossed the image during the exposure.

Starlink, the constellation of satellites launched by SpaceX with the aim of providing satellite internet access. While only a couple of hundred have been launched to date, the company soon plans to put 12,000 in orbit, with a possible extension to 42,000 later in the 2020s.

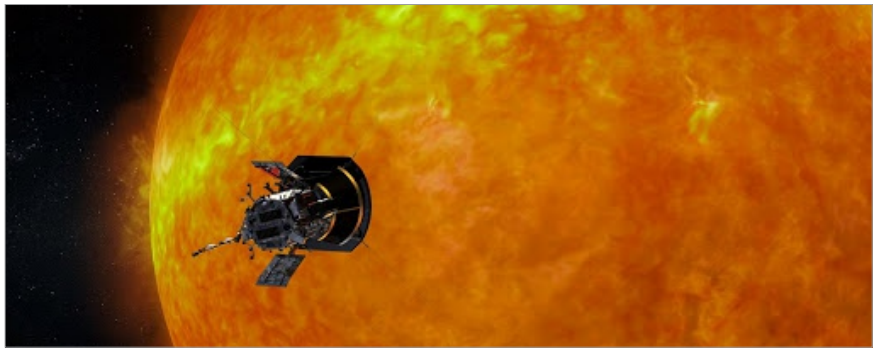
The astronomical community (including the Royal Astronomical Society and the American Astronomical Society) have voiced strong concerns about these plans, pointing out that so many bright satellites in orbit will leave trails on astronomical images (see image above), and could affect other wavelengths more seriously.

A new paper published to the arXiv on 4 February 2020 outlines the risks that these satellite constellations pose to astronomy.

“Astronomers are extremely concerned by the possibility that sky seen from Earth may be blanketed by tens of thousands of satellites, which will greatly outnumber the approximately 9,000 stars that are visible to the unaided human eye,” the authors say. “This is not some distant threat: it is already happening.”

The astronomical community started a petition in January 2020, which asks for legal protections for astronomical observing. “All of these requests come from the heartfelt concern of scientists arising from threatens to be barred from accessing the full knowledge of the Cosmos and the loss of an intangible asset of immeasurable value for humanity,” the authors say.

Solar probe measures Solar wind



The Parker Solar Probe, NASA's mission to explore the Solar atmosphere, has just released a new batch of results. These results were taken during two close passes of the Sun, in which the Probe passed just 0.16 astronomical units from the Solar surface -- (less than half the average distance to Mercury!). The dataset provided a huge amount of science, resulting in over 50 papers being published in the Astrophysical Journal.

One surprise result from this new batch of data is that the Solar Wind rotates much faster than expected. Close to the Sun, the strong magnetic field keeps the Solar Wind rotating along with the star. But out at the Earth's orbit, the wind no longer rotates (and just flows out of the Solar System). As the Probe got closer to the Sun, if found the Solar Wind was rotating at a blistering 50 kilometers per second (over 100,000 mph!). So far, scientists have been unable to explain how the Solar Wind picks up so much rotational speed.

Luckily, this is nowhere near the end for the trailblazing mission. At the end of January 2020 it reached its closest approach yet -- 0.12 AU -- and successive orbits will take it up to 0.05 AU from the Sun. This is just 10 times the Solar radius!

The PSP will soon have company, as the European Space Agency's 'Solar Orbiter' mission was launched on 10 February 2020.

Joke of the Week

They say that Curiosity killed the cat, but how did the cat get to Mars in the first place?