

Summary

What's New in Astronomy?

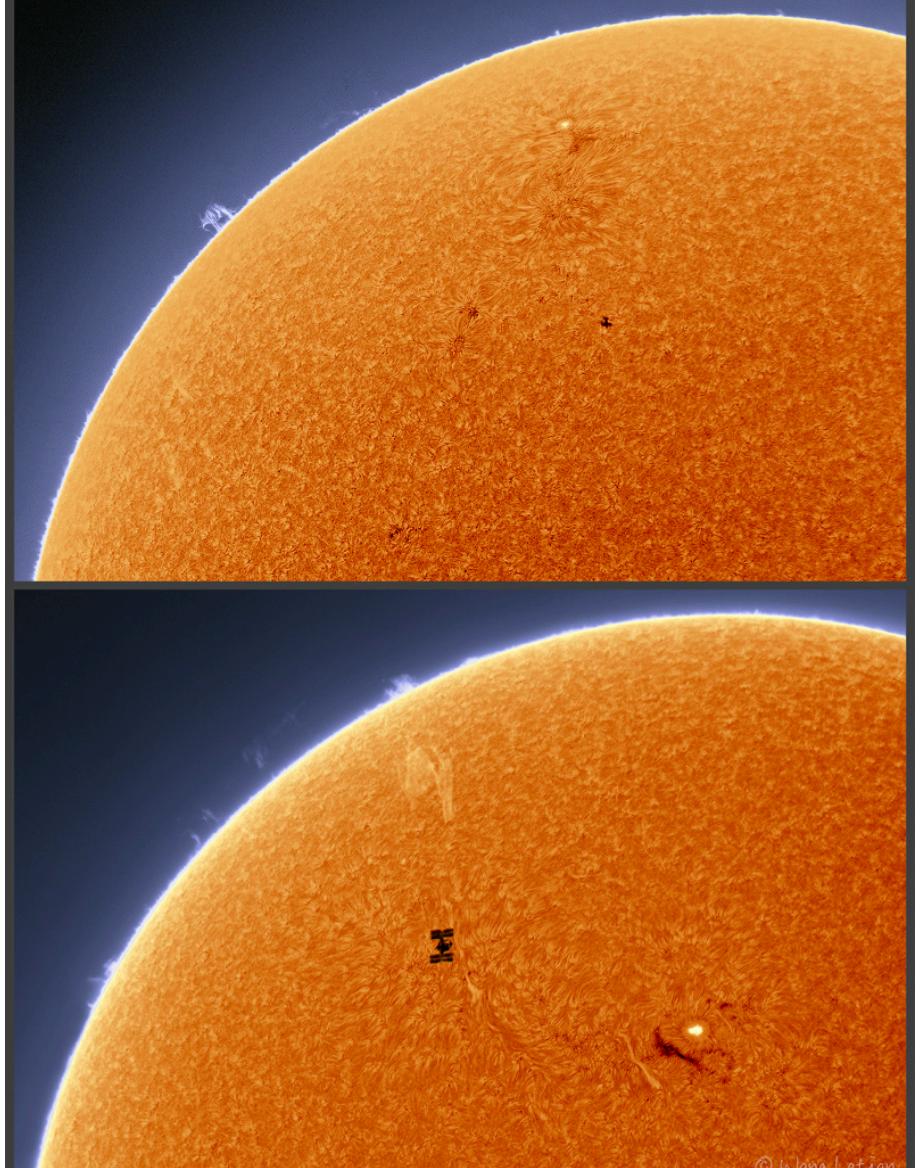
Learners at Wind Crest

Dick Edgar

July 1, 2021

A few updates

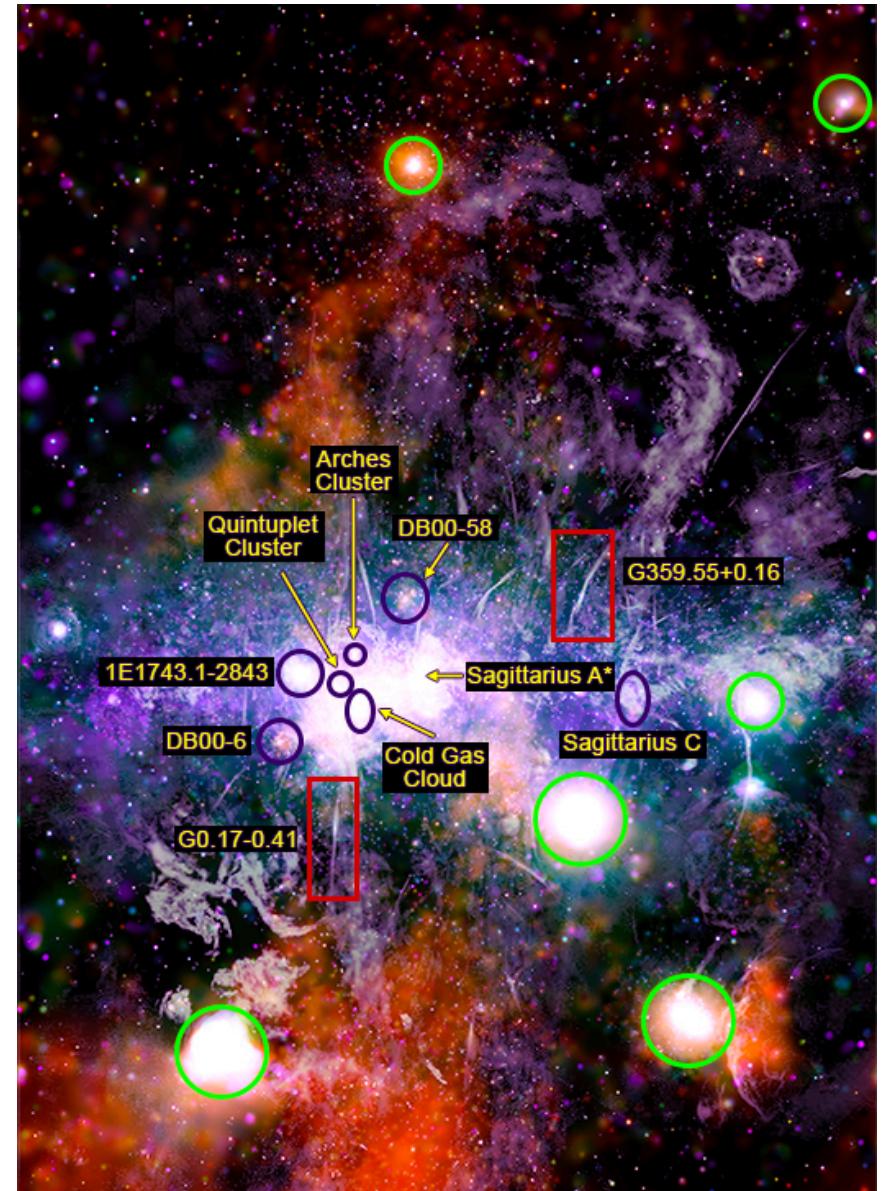
- Two pictures of the sun in a hydrogen filter, showing space stations (the Chinese one at top, the ISS at bottom).
- There are also a few prominences and sunspots.
- Objects in low earth orbit transit the sun in fractions of a second.
- Swiped from <https://apod.nasa.gov/apod/ap210626.html>



- Double exposure of the recent partial eclipse of the sun, from China at sunrise
- Long exposure overexposed the sun but got the landscape and the yellow sky
- Short exposure through a hydrogen filter got the grainy structure of the sun, sunspot, and a really interesting cloud.
- <https://apod.nasa.gov/apod/ap210628.html>

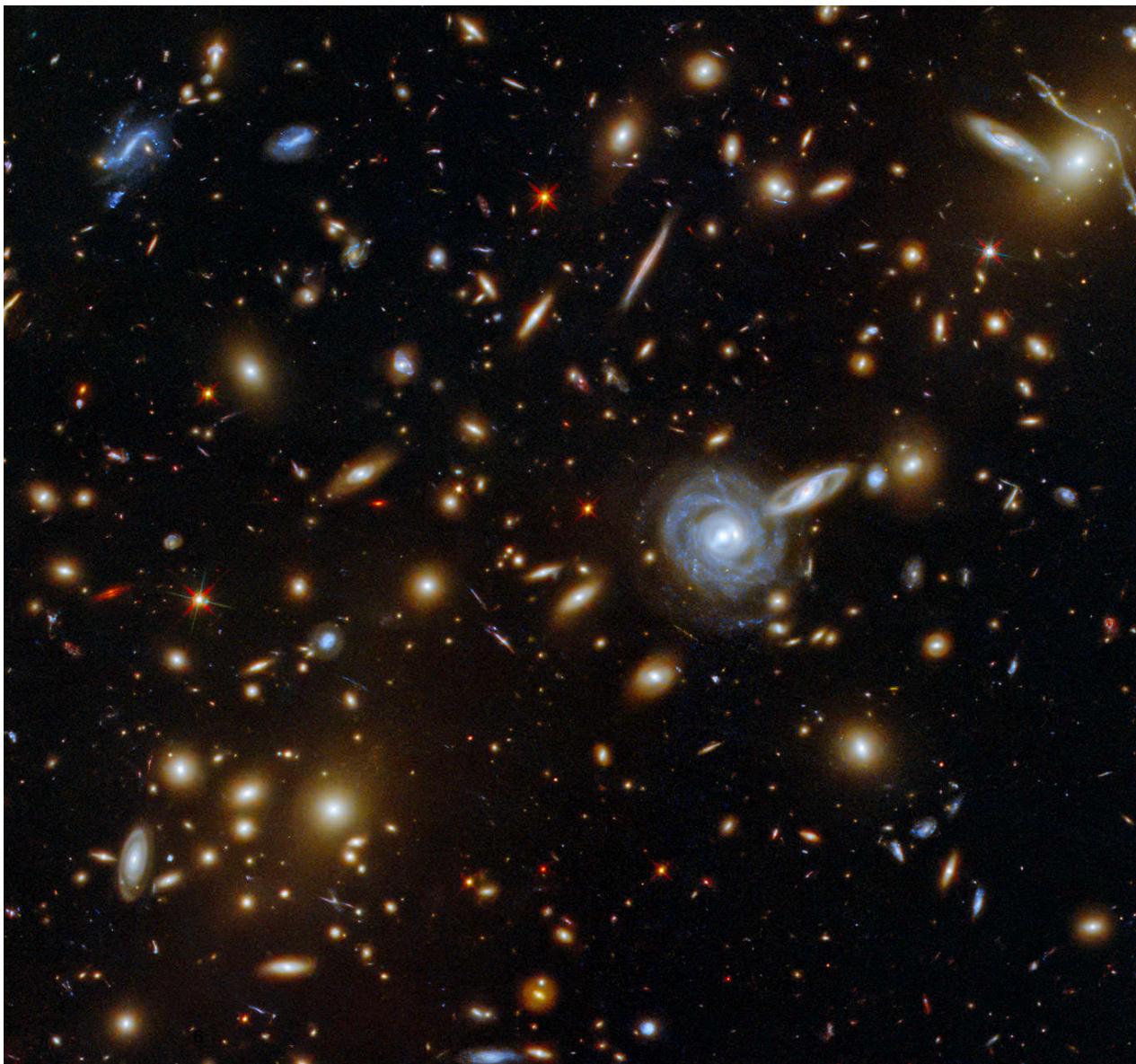


- There's a labeled radio + x-ray image of the center of the Galaxy here: <https://chandra.si.edu/photo/2021/gcenter/>
- They also provide words and the radio & x-ray images separately.

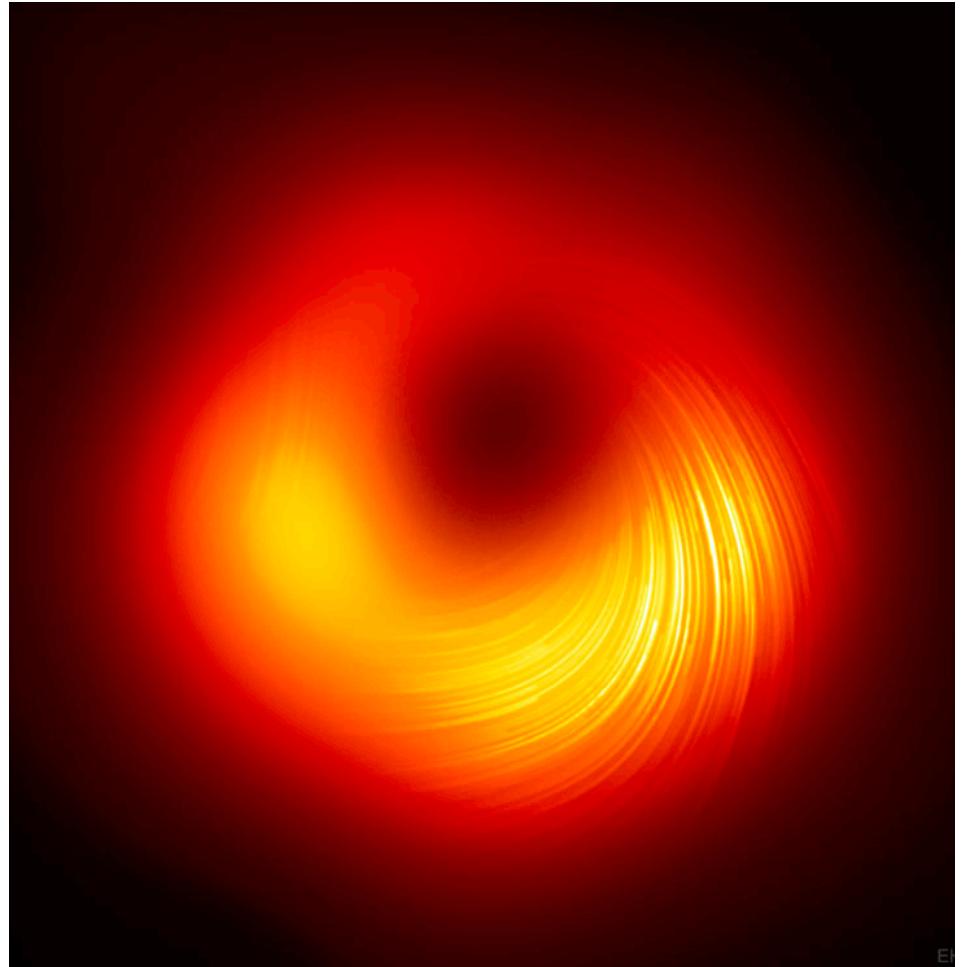


- Not to keep you up at night or anything...
- There are 4000+ known planets orbiting other stars
- It turns out that 43 of these could see the earth transiting the sun. If anyone there is looking for us, they can find us with technology like what we have...
- More info here: <https://www.syfy.com/syfywire/how-many-aliens-planets-can-see-earth-more-than-we-first-thought>

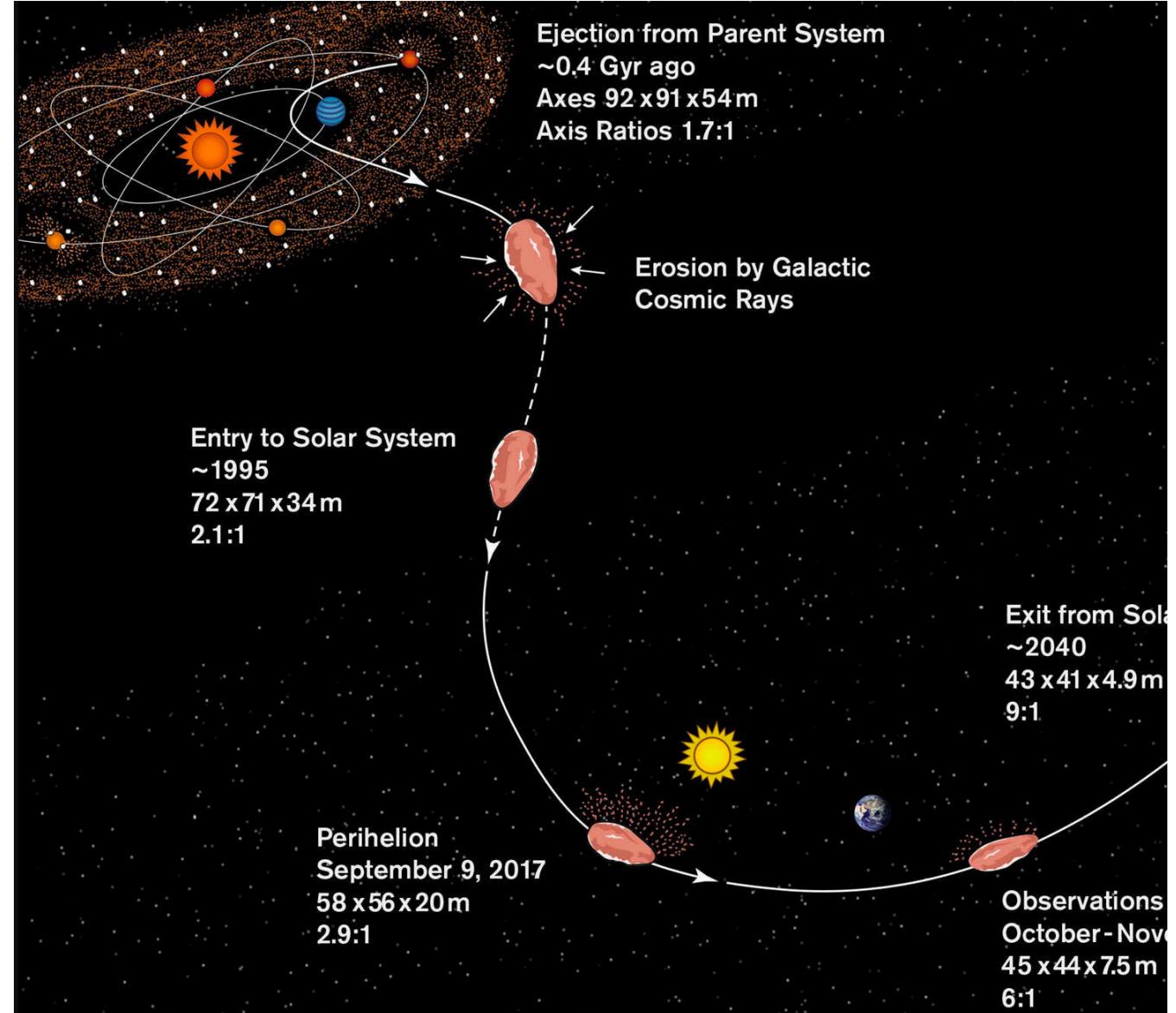
- There are lots of galaxies out there.
- This is a piece of a cluster of galaxies, called Abell S0295
- Every fuzzy blob is a galaxy. There are a few spiky images of foreground stars (mostly red).
- The odd filament draped across the upper right galaxy is a gravitationally lensed image of a background galaxy.
- Credit: Hubble



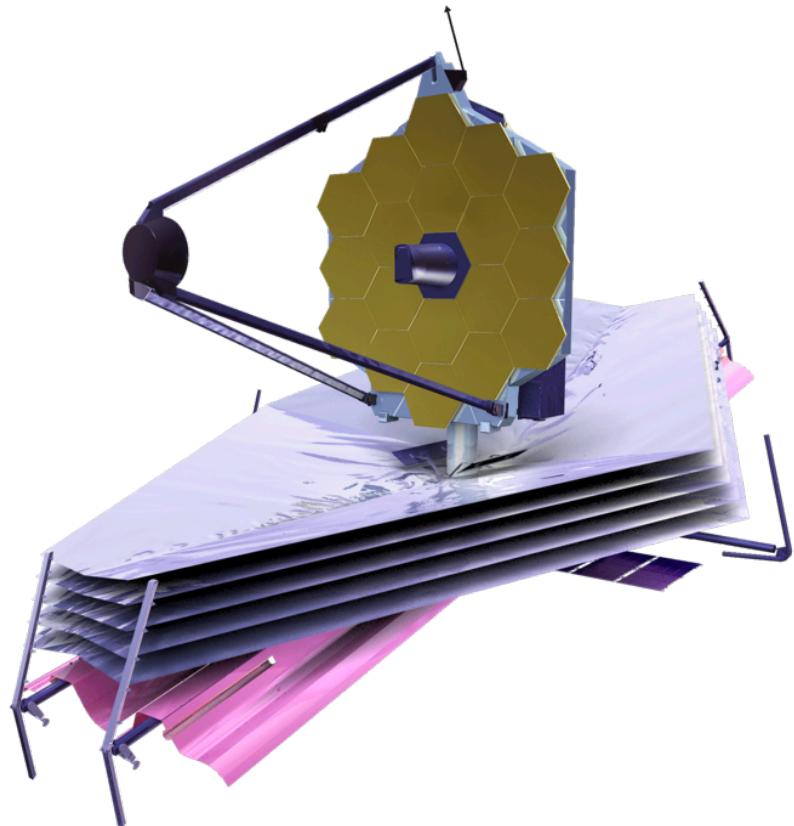
- The Event Horizon Telescope folks have analyzed the polarization in their image of M-87* (the big black hole in galaxy M-87).
- This shows how the magnetic field in the disk is arranged, spiraling in with the material the black hole is eating.
- The magnetic field is important in launching the jet from the disk.
- <https://apod.nasa.gov/apod/ap210331.html>



- Oh, and that interstellar comet? Maybe it's a chip off a pluto-like object in another solar system.
- Solid nitrogen ice is a good candidate for what it's made of. Some outgassing near the sun produced a small amount of rocket-like thrust.
- It's flat like a used bar of soap, and tumbling.



- The James Webb Space Telescope is due for launch in Nov 2021.
- Ariane V rocket from French Guiana bound for the earth-sun L2 Lagrange point (anti-sunward from earth).
- Complicated unfolding to final configuration
- will do infrared, planet hunting, early universe observations.
- 6.5 m diameter telescope



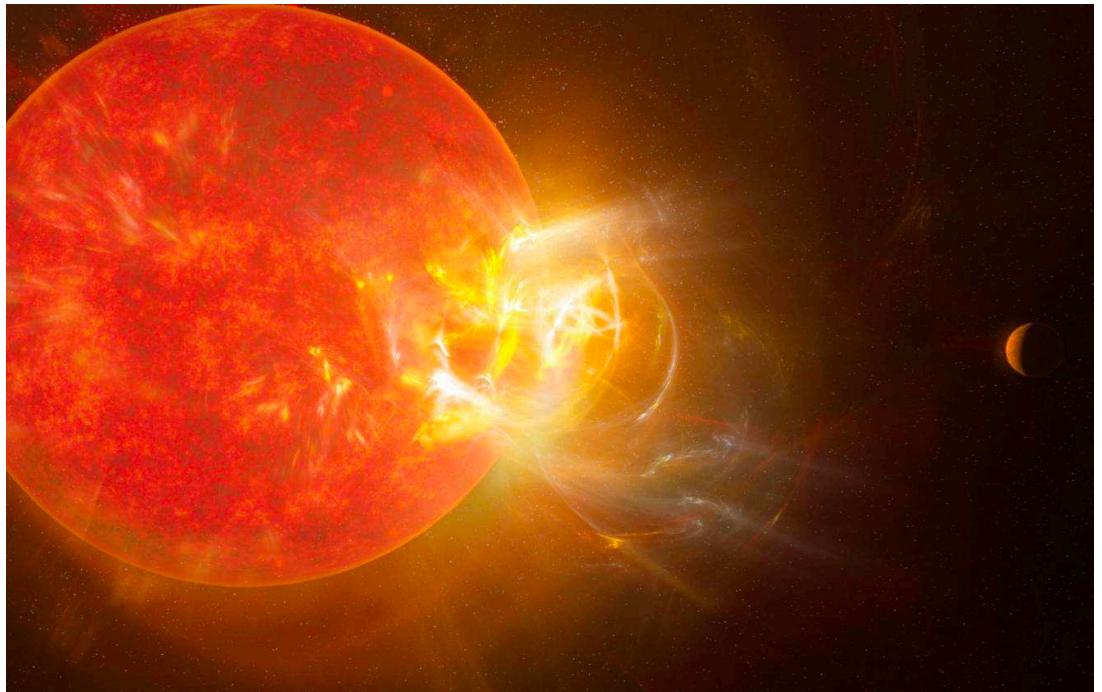
- The gravitational wave people announced two events of neutron stars merging with black holes this week.
- $8.9 + 1.9$ solar masses for one, and $5.7 + 1.5$ for the other.
- This is an artist's conception of the final seconds, as they orbit near light speed.
- Mass ratio suggests the BH swallowed the NS whole, so there was no light signal emitted.



Proxima Centauri b

- Many nearby stars have planets. Some planets transit the star as seen from the earth; others we detect from periodic shifts in the velocity of the star (recoil motion due to the planet orbiting).
- The Alpha Centauri system is about 4.3 light years away. Alpha Cen A is a solar-type star; Alpha Cen B is somewhat less massive & cooler, in an 80-year orbit around A. Proxima Cen is a frumpy little red star (mass 0.12 suns) in a 500,000 year orbit around A&B.
- Proxima Cen has an earth-like planet in its “habitable” zone... 11-day orbit, mass about 1.2 earth. Unknown if it has an atmosphere, but if so, the dayside temps could be quite balmy. It’s probably tide-locked (one side always facing the star).

- Not so fast...
- In May 2019 Prox Cen had a huge stellar flare. If the ejecta hit the planet, it would blow away most of the atmosphere, even if there was a magnetic field.
- Largest stellar flare on record (many probably are missed).
- Little red stars are often active with frequent large flares.
- credit: Meredith MacGregor, CU-Boulder.



- Questions? Comments?
- Please print the course evaluation form, fill it out, and put it in the Learners cubby in your building or mailroom. It's also linked on my website. Don't have a printer? Let me know and I'll get you a paper copy.
- There's obviously a lot more going on in astronomy than I had time to talk about. If you have questions, look me up, I'm in the directory.