

**Program** "US Space & Rocket Center in  
Huntsville, AL". –Mark Thorson

**Volume 28, No.9**  
**January 2023**

**Greg Smith – editor.**

**Meeting: Wednesday 7pm**  
**January 18, 2023**  
**ZOOM/R. A. Long Rm 130**

So, a new (to us) comet is supposed to grace our skies this week. I hope we can get one cloudless evening to see it. It is supposed to be in the Northwestern sky on a trajectory towards the North Star. Maybe we can see it with our naked eye, for sure with binoculars and small telescopes. This is the first one in about two and a half years that we should be able to see.

The last time it was around our neighborhood was some 50,000 years ago at about the time the Neanderthals were mingling with the early modern humans.

So try to see it if possible because it will be visible for several days. It won't be back for another 50,000 years.

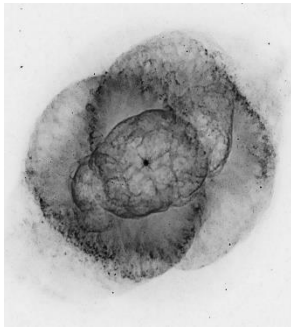
I am finding it hard to keep up with all the stuff the astronomers are finding, from new exoplanets and comets to dimming stars and colliding black holes. It seems the magazines have a hard time reporting all the new stuff. Their websites seem to barely keep up when they are updated daily or weekly. I am sure you too can barely stay up to date with all that is going on.

This is truly a great time to be around hearing about all the new things that are

being found. This, in some ways, is a 'golden age' of Astronomy.

I have to remember that all the discoveries in the past hundred years were often years apart. Now we are finding them weekly or even daily. Our in space equipment is hundreds if not thousands of times better than just having a large refractor telescope sitting on a hill at a university near a big city. Those telescopes that found so much, were limited by the blurring of the atmosphere and weather conditions. Putting big reflector telescopes on high mountain tops above a lot of weather boosts the detail of what can be seen. It is a massive improvement over those old refractors on a hill. To get above the atmosphere with no distortions, allows us to see so much more. Hubble blew the minds of astronomers. The Webb has been as big a jump over Hubble as Hubble was over the big reflectors on mountain tops even with the lasers and adaptive optics.

*Every Night is a Starry Night*  
*Every Day is a Star Filled Day*



Too many  
too soon.



## **Images and spectra from the James Webb Space Telescope suggest that the first galaxies in the universe are too many or too bright compared to what astronomers expected.**

BY: MONICA YOUNG Sky and Telescope

Evidence is building that the first galaxies formed earlier than expected, astronomers announced at the 241st meeting of the American Astronomical Society in Seattle, Washington.

As the James Webb Space Telescope views swaths of sky spotted with distant galaxies, multiple teams have found that the earliest stellar metropolises are more mature and more numerous than expected. The results may end up changing what we know about how the first galaxies formed.

### ***YOUNG BUT MATURE***

Speaking as part of the Cosmic Evolution Early Release Science (CEERS) collaboration, Jeyhan Kartaltepe (Rochester Institute of Technology) reported Webb's views of galaxies when the universe was between 500 million years and 2 billion years old.

Previous studies, such as those done using the Hubble Space Telescope, had suggested that as we look back toward a younger universe, the stable rotating disks of today give way to more chaotic shapes, representative of the violent mergers that built up the first galaxies. Then again, those previous studies also had a hard time classifying the most distant ones, which looked like little more than smudges. That's where the Webb telescope comes in.

The longer wavelengths Webb detects enable it to see farther back in time. Webb's images are also sharper than Hubble's, and its sensitivity greater. The CEERS group has used the new data (both images and spectra) to find 850 early galaxies, measure the distance to each one, and then tag its shape as "disk," "spheroid," or "irregular."

Those classifications were not mutually exclusive. "Galaxies are complex, and they don't necessarily fall into just one box," Kartaltepe says. Some galaxies, for example, have both a disk and a central bulge, much like the Milky Way.

In the future, such classifications will probably be left to computers; Kartaltepe's student, Caitlin Rose (also at RIT) is already working on *convolutional neural networks* and other computational methods that will eventually take over. But in the meantime, the job is still very much human: Three CEERS team members examined each of the 850 galaxies to make the classifications.

Despite their youth, the galaxies had shapes similar to those nearer to us. The percentage of disk galaxies declined only slightly in the early universe, while the fraction of those with a central bulge and those with an irregular shape stayed roughly constant over cosmological time.

Since disks are thought to form only in serene environments, in which stars can settle into a spinning skirt instead of being thrown about, their prevalence in a universe only a few percent of its current age is a bit like seeing teens when expecting toddlers. "We're not surprised to see disk galaxies," Kartaltepe clarifies. "I think the surprise is to see *so* many of them. . . . We're really not seeing the earliest stages of galaxy formation yet."

At the same time, she notes that yesterday's disks are different than modern ones. "They're not today's Milky Way," she notes. "They're turbulent, they're messy, and we need to study them more."

## ***AN EMBARRASSMENT OF DISTANT GALAXIES***

Speaking at the same AAS press conference, Haojing Yan (University of Missouri) reported on galaxies even earlier in cosmic history. Using Webb images at multiple wavelengths, Yan found 87 distant galaxies behind the galaxy cluster SMACS 0723, their light magnified and distorted by the cluster's gravity. The galaxies appear to date to between 200 million and 400 million years after the Big Bang (corresponding to a *redshift* as great as 20, in astronomer-speak).

These candidates await spectroscopic confirmation: Their redshifts are only estimates for now. But so far, spectroscopic confirmations of other galaxies have confirmed the vast majority of preliminary distances. Even if only half of Yan's selection turn out to be nearby galaxies

masquerading as distant ones, the latter number would still be unexpectedly large. “Our previously favored picture of galaxy formation in the early universe must be revised,” he says.

One of the theorists tackling this problem is Jordan Mirocha (Jet Propulsion Laboratory), who presented later in the day. “There's either an overabundance of galaxies, or they're much brighter than our typical models predict,” Mirocha says. He argues that multiple, interrelated factors are at work in throwing off predictions.

The first galaxies formed in still-growing *dark matter halos*, with ordinary hydrogen gas following the gravitational pull of the amassing dark matter particles. That inflow of matter, Mirocha suggests, might have stymied the stellar feedback that slows star formation in present-day galaxies. Yet even as the furious formation of new stars would cause early galaxies to appear bright, it would also generate dust, which in turn dims the galaxies.

Balancing all these different factors will be key to understanding how the first galaxies formed. Mirocha puts it mildly: “I think we have more to think about.”

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☞ **January 2023 Meeting** ☞

DATE: January 18, 2023

TIME: 7:00pm

PLACE: Hybrid in person / Zoom - originating from R, A. Long H. S. Rm 130

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## **Moon Phases**

**Full**: Jan. 17, Mon.     **3<sup>rd</sup> Qtr.**: Jan. 25, Tue.     **New**: Jan. 31, Thur.     **1<sup>st</sup> Qtr.**: Feb. 8, Tue.

**End of twilight** - when the stars start to come out.

Wed, Jan 18th 5:29pm   Mon. Jan 30 5:45pm   Fri. Feb 10<sup>th</sup> 6:01pm   Wed Feb 15 6:08pm

**The Star Report** is posted on the clubs website: 1. It is listed in the blog portion of the website.

### **Minutes of the December FOG Meeting**

We had our annual Christmas party. Ted Gruber and his wife graciously hosted the party for us. There were eight of us who attended : Greg Smith, Steve Powell and his wife, Hakkayya Suttlin, Becky Kent, Tom Meek & wife, and Sergey Pisarchuk,  
A good round of White Elephant was played. With very interesting gifts.

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## Friends of Galileo Club Officers

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## Next Month's Newsletter Deadline

The deadline for items in next month's newsletter is:  
**Wednesday: seven days before next meeting.**

**Please feel free to send in your thoughts and experiences about your astronomical adventures.**

Submit your material by E-mail to: [gryth@msn.com](mailto:gryth@msn.com)

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 Longview, WA

