

Capital Area Astronomy Association



Abrams Planetarium

Next meeting

Wed. December 6th
Sky talk 7:00 pm / meeting 7:30

- ☀ **President's column**
- ☀ **Forest of molecular signals**
- ☀ **JoAnn Fae Kalemkiewicz**
- ☀ **Upcoming events**



Presidents column

Mike Rogers

President's Column

Our Wednesday Dec. 6 meeting at 7 pm will be our annual holiday social event in the lobby of the Planetarium. Please bring a dessert or appetizer-style dish to pass, your own paper plate and tableware, and the non-alcoholic beverage of your choice.

Also, feel free to bring along surplus astronomy gear or books you may wish to swap or sell.

Happy holidays and looking forward to seeing all of you on Dec. 6 at the Planetarium.

As always, please let me know if you have ideas or suggestions for upcoming programs.

Please email your program suggestions to me at mwrogers7@gmail.com

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My E-mail: kmelvin33@gmail.com

Forest of molecular signals in star forming galaxy

November 6, 2017

National Institutes of Natural Sciences

Astronomers have found a rich molecular reservoir in the heart of an active star-forming galaxy with the Atacama Large Millimeter/submillimeter Array (ALMA). Among eight clouds identified at the center of the galaxy NGC 253, one exhibits very complex chemical composition, while in the other clouds many signals are missing. This chemical richness and diversity shed light on the nature of the baby boom galaxy.

Ryo Ando, a graduate student of the University of Tokyo, and his colleagues observed the galaxy NGC 253 and for the first time, they resolved the locations of star formation in this galaxy down to the scale of a molecular cloud, which is a star formation site with a size of about 30 light-years. As a result, they identified eight massive, dusty clouds aligned along the center of the galaxy.

"With its unprecedented resolution and sensitivity, ALMA showed us the detailed structure of the clouds," said Ando, the lead author of the research paper published in the *Astrophysical Journal*. "To my surprise, the gas clouds have a strong chemical individuality despite their similarity in size and mass."

Different molecules emit radio waves at different frequencies. Using this feature, the team investigated the chemical composition of the distant clouds by analyzing the radio signals precisely. They identified signals from various molecules including formaldehyde (H₂CO), hydrogen cyanide (HCN), and many organic molecules.

One of the clouds stood out with its extremely rich chemical composition. The team identified footprints of 19 different molecules in the cloud, such as thioformaldehyde (H₂CS), propyne (CH₃CCH), and complex organic molecules including methanol (CH₃OH) and acetic acid (CH₃COOH). "The data are filled with the signals of various molecules," said Ando. "It is like a forest of molecules."

Many "molecular forests" have been found in our Milky Way Galaxy, but this is the first example outside the Milky Way. Researchers assume that the molecular jungle is an aggregate of dense and warm cocoons around bright baby stars.

The cocoon gas is heated from inside by hundreds of young stars and a myriad of chemical reactions is driven to form various molecules.

Interestingly, the number of chemical signals is different in different clouds. For example, another cloud among the eight has a very sparse chemical composition, even though it is located within dozens of light-years of the chemically rich cloud. Such a diverse nature of star forming clouds has never been seen before and could be a key to understanding the starburst process in this galaxy.

NGC 253 is a prototypical active star forming galaxy, or starburst galaxy. It is located 11 million light-years away in the constellation Sculptor. Starburst, or baby boom, galaxies have been the major drivers of star formation and galaxy evolution throughout the whole history of the Universe. Therefore it is crucial to understand what exactly is going on in the heart of such galaxies.

provided by [National Institutes of Natural Sciences](#). Note: Content may be edited for style and length.

UPCOMING EVENTS

MSU Observatory Open House

Check MSU website for any winter programs

Abrams Planetarium programs.

Family show. Sunday 2:30 pm: **George and oatmeal save Santa.** Santa Claus is missing! Mrs. Claus is worried and asks Oatmeal the snowman to help find him. Join Oatmeal and his friend George, the planetarium wizard, as they travel the world in search of Santa. Along the way they are told constellation stories from many cultures and how to use the stars of the Big Dipper to find north. This holiday show is particularly appropriate for young children and their families.

Feature show. Fri. Sat. 8:00pm, Sun. 4:00pm: **Season of light.** Many of the familiar customs that we observe this time of year have an astronomical connection. Our holiday offering explores the traditions that we associate with this special season.

Fox park observatory open houses: December 8th, 9th, (8pm till 11:00pm), Weather permitting, check their website for details.

jb.foxpark@gmail.com

Galaxies of Pegasus

Captivating galaxies of Pegasus have taken up some imaging time of late. Galaxy clusters around NGC-7331 and Stephans quintet have been well placed for imaging and when weather allowed I was able to acquire enough data for a fair image on each. I spent several nights on each object NGC-7331 and Stephans quintet. NGC-7331 has a bright core and faint outer detail in the spiral arms that shows up well. Some inner detail is visible of the spiral arms and dust clouds closer to the core. Several other small satellite galaxies are visible in the image also. Total time of exposure was 58 minutes thru Luminance, red, green, blue filters with a SBIG ST-2K camera on the 24" scope. Stephans quintet is a group of 5 galaxies all tightly squeezed into an area 3.5' wide. The larger blue galaxy is a foreground object and only a chance alignment and is not interacting with the others. Total time for that image is 67 minutes with LRGB filters. I obtained data from other nights that I will try to add to these images also. I have started to image NGC-7814 an edge on galaxy in the square of Pegasus resembling NGC-891 in Andromeda, which is not to far away along with M-31 and M-33. When the moon is out of the way, try to get out and observe these celestial beauties.

Kurt



Stephans quintet galaxy cluster. Image by K. Melvin

Club dues are due. Please send to Chuck \$12.00
 Treasurer E-mail: chuck_taricska@yahoo
 Thank you all for supporting the group.

JoAnn Fae Kalemkiewicz

Lansing

JoAnn, 64, passed away on October 18, 2017. She was born in Lansing, Michigan, the daughter of Henry and Helen (Mote) Kalemkiewicz.

JoAnn grew up watching Star Trek and this was a catalyst to her love of science and the stars. She went on to pursue a bachelor's degree in biochemistry becoming an alumni of Michigan State University. But JoAnn's love of the stars did not distract her from the world around her and she went on to be an advocate for conservation. Her career followed this passion in the Environmental Quality Department for the State of Michigan.

Beyond JoAnn's duty to science was her passion for living. She enjoyed numerous hobbies from snow skiing to sailing the Great Lakes, singing and gaming. She shared this joy with her friends and family. She also made time to explore her love of astronomy by constructing her own telescope to view numerous cosmological events around the world. When JoAnn was not travelling to experience the beauty of the world on her skis or the wonders of space she helped in the community with her love of cats. She would volunteer at the Mid-Michigan Cat Rescue. She took care of and fostered many cats at the rescue center in Dimondale, allowing many families to adopt a cat.

She was preceded in death by her mother, father and older sister. She is survived by a brother (Jerry Sr.), sister-in-law (Linda), three nieces (Sheena, Serena and Shela), and a nephew (Jerry Jr.).

Memorials may be given to the Mid-Michigan Cat Rescue in Albion, Michigan. Visit these details at JoAnn's webpage at www.estesleadley.com

<http://m.legacy.com/obituaries/lmj/obituary.aspx?n=&pid=187015374&referrer=0&preview=True>

 Thank you JoAnn for your years of friendship and devotion to the sciences. Rest in peace.

If you have Astronomy items for sale, images, test reports or observations you would like to post to the newsletter, please send them to me at kmelvin33@gmail.com

Capital Area Astronomy Association Newsletter



Ngc-7331 in Pegasus by K. Melvin

The planetarium is open

The Observatory is open
(Weather permitting)

The Sky is open

Go look up!
AND ENJOY

The Geminid meteors peak on the night of the 13th morning of the 14th with about 120 meteors per hour but most are slower meteors at about 22 miles per second.

Abrams Planetarium
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