Smoky Mountain Astronomical Society

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S. C. R. A. P. S.

Society's ChRonological Astronomical PaperS

All truth passes through three stages. First, it is ridiculed. Second, it is violently opposed. Third, it is accepted as being self-evident. - Arthur Schopenhaur

CADES COVE

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SMAS Public Star Party at Cades Cove, October 4, 2008

By Mike Littleton

Members of SMAS held the third annual public star party at Cades Cove in the Great Smoky Mountains National Park on Saturday, October 4th. This event is at the invitation of the National Park Service in the GSMNP. Mike Maslona of the Service started the public presentation at dusk with a welcome for SMAS and then a demonstration of pronunciation of constellation and star names with a volunteer from the audience. Lee Erickson continued with a presentation on American Indian lore about the heavens. While Lee spoke, other members of SMAS in the audience pointed at the objects of which Lee spoke with laser pointers. Lee concluded his presentation with the legend of the origin of the Pleiades from the Omomdaga and Iroquois Nations. Read about the legend at

http://www.angelfire.com/ca/Indian/Pleiades.html

As darkness fell, the audience moved to the telescopes. The first object viewed was the Moon at 28% illumination near Antares. There were many "wows" and "ohs" by the viewers. Later, M-31 and the Ring Nebula were popular targets. I brought my 13.1" dobsonian reflector and showed the viewers M-31 and its two bright satellite galaxies. The laser pointers really helped to show viewers where the telescope was pointed and allow them to use binoculars to find bright objects like the Double Cluster. At 9:30 PM, official end time, the rangers made a half-hearted attempt to move the visitors off the field, but acquiesced until 10 PM because the enthusiasm of the crowd.

As a park ranger and I drove away from the field, he talked about all the compliments he received from the visitors as they left the field. We had about 175 visitors. Mike Maslona is already asking about the date for next year's public star party. Our thanks to him and the other rangers. Thanks also to the participating astronomers: Joe Baldwin, Stephen Braddy, Gary Bridges, Duane Dunlap, Lee Erickson, Wally Knight, Michael McCulloch, Kenny Pridgen, Nick Schepis, Lee Wallace, Vicente Diaz, and Elissa Chesler.

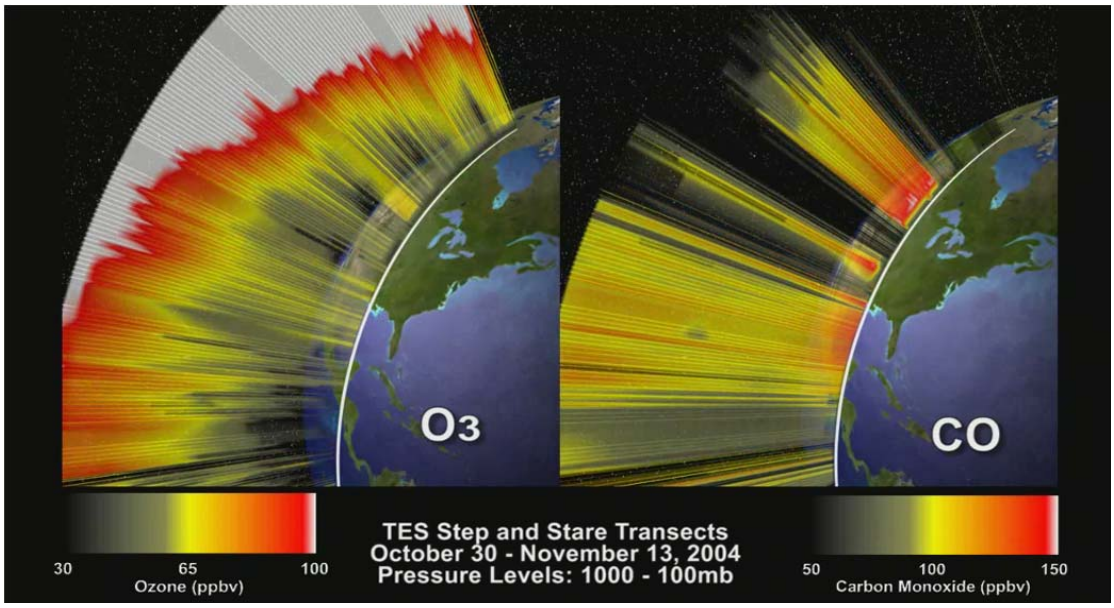
The Chemical Weather Report

"Sunny tomorrow with highs in the mid-70s. There's going to be some carbon monoxide blowing in from forest fires, and all that sunshine is predicted to bring a surge in ground-level ozone by afternoon. Old and young people and anyone with lung conditions are advised to stay indoors between 3 and 5 p.m."

Whoever heard of a weather report like that?

Get used to it. Weather reports of the future are going to tell you a lot more about the atmosphere than just how warm and rainy it is. In the same way that satellite observations of Earth revolutionized basic weather forecasting in the 1970s and 80s, satellite tracking of air pollution is about to revolutionize the forecasting of air quality. Such forecasts could help people plan around high levels of ground-level ozone—a dangerous lung irritant—just as they now plan around bad storms."

The phrase that people have used is chemical weather forecasting," says Kevin Bowman of NASA's Jet Propulsion Laboratory. Bowman is a senior member of the technical staff for the Tropospheric Emission Spectrometer, one of four scientific sensors on NASA's Aura satellite.



Example of visualization of data from the Tropospheric Emission Spectrometer. These frames are from an animation that steps through transects of the atmosphere profiling vertical ozone and carbon monoxide concentrations, combining all tracks of the Aura satellite during a given two week period.

Aura and other NASA satellites track pollution in the same way that astronomers know the chemical composition of stars and distant planetary atmospheres: using spectrometry. By breaking the light from a planet or star into its spectrum of colors, scientists can read off the atmosphere's gases by looking at the "fingerprint" of wavelengths absorbed or emitted by those chemicals. From Earth orbit, pollution-watching satellites use this trick to measure trace gases such as carbon monoxide, nitrogen oxide, and ozone.

However, as Bowman explains, "Polar sun-synchronous satellites such as Aura are limited at best to two overpasses per day." A recent report by the National Research Council recommends putting a pollution-watching satellite into geosynchronous orbit—a special very high-altitude orbit above the equator in which satellites make only one orbit per day, thus seeming to hover over the same spot on the equator below. There, this new satellite, called GEO-CAPE (Geostationary Coastal and Air Pollution Events), would give scientists a continuous eye in the sky, allowing them to predict daily pollution levels just as meteorologists predict storms.

"NASA is beginning to investigate what it would take to build an instrument like this," Bowman says. Such a chemical weather satellite could be in orbit as soon as 2013, according to the NRC report. Weather forecasts might never be the same.

Learn more about the Tropospheric Emission Spectrometer at

tes.jpl.nasa.gov

Kids can learn some elementary smog chemistry while making "Gummy Greenhouse Gases" out of gumdrops at

spaceplace.nasa.gov/en/kids/tes/gumdrops

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

Extreme Starburst

by Dr. Tony Phillips

A star is born. A star is born. A star is born. .

Repeat that phrase 4000 times and you start to get an idea what life is like in distant galaxy J100054+023436. .

Astronomers using NASA's Spitzer Space Telescope and ground-based observatories have found that the galaxy gives birth to as many as 4000 stars a year. For comparison, in the same period of time the Milky Way produces only about 10. This makes J100054+023436 an extreme starburst galaxy.

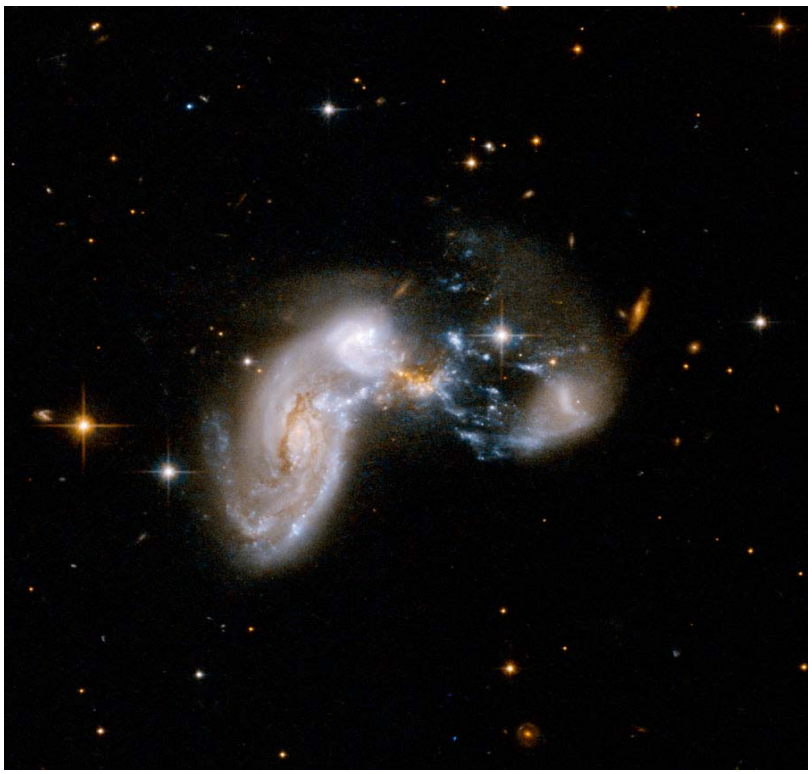
“We call it the ‘Baby Boom galaxy,” says Peter Capak of NASA’s Spitzer Science Center at the California Institute of Technology in Pasadena, CA. "It is undergoing a major baby boom, producing most of its stars all at once. If our human population was produced in a similar boom, then almost all people alive today would be the same age."

Capak is lead author of a paper entitled "Spectroscopic Confirmation of an Extreme Starburst at Redshift 4.547" detailing the discovery in the July 10th issue of *Astrophysical Journal Letters*.

The galaxy appears to be a merger, a “train wreck” of two or more galaxies crashing together. The crash is what produces the baby boom. Clouds of interstellar gas within the two galaxies press against one another and collapse to form stars, dozens to hundreds at a time.

This isn’t the first time astronomers have witnessed a galaxy producing so many stars. “There are some other extreme starburst galaxies in the local universe,” says Capek. But the Baby Boom galaxy is special because it is not local. It lies about 12.3 billion light years from Earth, which means we are seeing it as it was 12.3 billion years ago. The universe itself is no older than 14 billion years, so this galaxy is just a youngster (Capak likens it to a 6-year-old human) previously thought to be incapable of such rapid-fire star production.

The Baby Boom galaxy poses a challenge to the Hierarchical Model of galaxy evolution favored by many astronomers. According to the Hierarchical Model, galaxies grow by merging; Add two small galaxies together, and you get a bigger galaxy. In the early years of the universe, all galaxies were small, and they produced correspondingly small bursts of star formation when they merged. “Yet in J100054+023436, we see an extreme starburst. The merging galaxies must be pretty large.”



The "Baby Boom" galaxy loosely resembles the galaxy shown here, called Zw II 96, in this Hubble Space Telescope image. This galaxy is only 500 million light-years away, while the Baby Boom galaxy is 12.3 billion light-years away.

* * *

Capak and colleagues are busy looking for more Baby Boomers "to see if this is a one-off case or a common occurrence." The theory of evolution of galaxies hangs in the balance.

Meanwhile… A star is born. A star is born. A star is born.

See more breathtaking Spitzer images at

www.spitzer.caltech.edu/Media/mediaimages.

Kids can play the new Spitzer "Sign Here!" game at

spaceplace.nasa.gov/en/kids/spitzer/signs

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

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SUN	MON	TUE	WED	THU	FRI	SAT
UTK—roof of Neilson Physics Building on The Hill at UT 1st & 3rd Fridays TAO —Tamke-Allan Observatory Public Stargaze Watts Bar Lake, Roane County 1st & 3rd Saturdays						1 TAO
2	3	4	5	6	7 UTK	8
9	10	11	12	13	14 SMAS …..Meeting …. PSTCC …. 7 pm	15 TAO
16	17 Leonid Meteor Shower peak midnight to 5 am	18	19	20	21 UTK	22
23	24	25	26	27  ...and, *a New Moon*	28	29
30					**SCRAPS depends Upon its friends**	**Help! Help!**