

Event Horizon

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Hubble Suggests First Stars Opened in a Blaze of Glory

The deepest views of the cosmos from NASA's Hubble Space Telescope yield clues that the very first stars may have burst into the universe as brilliantly and spectacularly as a fireworks finale. In this case though the finale came first, long before Earth, the Sun and the Milky Way Galaxy formed.

If this interpretation is correct, it offers a tantalizing possibility that astronomers may behold this stellar blaze of glory when they use NASA's Next Generation Space Telescope and other future space telescopes to probe even farther into the very early universe.

Studies of Hubble's deepest views of the heavens by Kenneth

M. Lanzetta of the State University of New York at Stony Brook and colleagues lead to the preliminary conclusion that the universe made a significant portion of its stars in a torrential firestorm of star birth, which abruptly lit up the pitch-dark heavens just a few

hundred million years after the big bang. Though stars continue to be born today in galaxies, the star birthrate could be a trickle compared to the predicted gusher of stars in those opulent early years.



This new idea of a continually escalating rate of star birth the farther Hubble looks back in time offers a dramatic revision of previous Hubble Deep Field studies that proposed that the star birthrate in the early universe ramped up to a "baby boom" about halfway back to the beginning of the universe.

"If this can be verified it will dramatically change our understanding of the

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Chair's Report

After a dominantly cloudy December, I am pleased to report that I am writing this column from Cerro Tololo Inter-American Observatory in Chile. The temperature is wonderful, the sky is always clear and the moon has been mostly absent from the nighttime sky. Who can complain?! One downside is that I will miss the January 2002 HAA meeting, but I am grateful to Grant Dixon for standing in for me and to Stewart Attlesley for preparing another interesting talk.

One sad piece of news is that Rosa Assalone, our longtime Event Horizon editor, has decided to step down after many years of service to the club. The few brave souls who have been editors in the past can testify to the thanklessness of having to compile and print a newsletter in the last few nanoseconds before a meeting, due to the tardiness of many contributors - such as the Chair! I'm

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hat you will all join me in thanking Rosa for doing a wonderful job - as they say "You will eat lamb in paradise!"

If you made it to this meeting, you will have noticed that it is at the Steam Museun instead of the Spectator. This is a result of the change in booking policy of the Spectator auditorium - we can't reserve it for whole years in advance. The next two meetings (Feb and Mar) are definitely at the Spectator Auditorium. We will do our best to keep the meeting place as immobile as possible!

Finally, it is my pleasure to announce that Anthony Tekatch has decided to "throw himself on the grenade" and to takeover as Event Horizon editor. Plet us all get him off to a running start by contributing articles well in advance of the Feb 2002 article deadline!!

Happy New Year and Clear Skies in 2002!

Doug Welch

HAMILTON AMATEUR ASTRONOMERS

Event Horizon is a publication of the Hamilton Amateur Astronomers (HAA).

The HAA is an amateur astronomy club dedicated to the promotion and enjoyment of astronomy for people of all ages and experience levels

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2001: A Space Year in Review (sort of)

This article deals with a rather quick summary of some of the astronomical events of the year 2001, as I saw it. In case I left anything out please excuse me as I did this article in a bit of a last minute rush. Feel free to add your own if you like.

January 9th- Total Lunar Eclipse visible from North America, and apparently well observed.

February 14- The NEAR spacecraft touches down on the surface of the asteroid Eros revealing features as small as 3 cm.

June 13- Mars reaches its best opposition since 1988 and is widely observed. Closest approach happens on June 21, the day of the summer solstice.

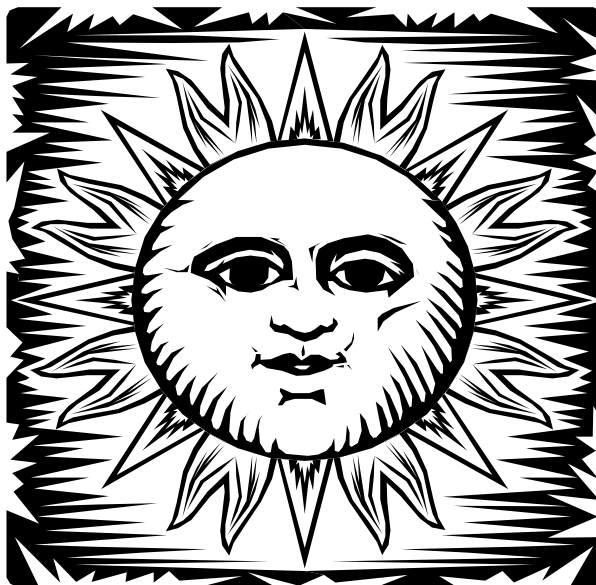
June 21- Total solar eclipse visible from sub-equatorial Africa. I observed this event from Zambia along with thousands of others. The skies were clear throughout the dry season.

June 26- A global dust storm breaks out on the surface of

Mars at the same time I was visiting Victoria Falls.

August 24- Discovery of the binary KBO 2001 QW 322, with a separation of 100,000 km.

September 5- Milky Way's black hole weighs in at 2.6 million solar masses.



September 22- The Deep Space 1 spacecraft flies past comet Borrelly and reveals the best views of a cometary nucleus.

October 24- The 2001 Mars Odyssey spacecraft enters into orbit about Mars much to the relief of NASA officials. The

spacecraft will commence mapping of Mars in January.

November 16- The Genesis spacecraft enters into a quasi-stable orbit about the L1 lagrangian point to begin its collection of solar wind particles.

November 17/18- Leonid Meteor Storm. The shower was by all accounts spectacular, even though the observed rates were lower than expected. I was fogged out and didn't see anything.

December 14- Annular solar eclipse visible from Central America, it was largely clouded out but some people saw the event.

Other items include more binary asteroids: 87 Sylvia, 107 Camilla, 22 Kalliope, and the trojan 617 Patroclus. The largest KBO to date 2001 KX76(28978) has an approximate diameter of 1200 km, thereby dethroning Ceres the largest asteroid. In addition there was also the discovery of possible ancient Martian lakes by the MGS spacecraft.

Ray Badgerow

Hubble...

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universe," said Dr. Anne Kinney, director of the Astronomy and Physics division at NASA Headquarters, Washington. "Because stars are the building blocks of galaxies and the birthplace of solar systems, proving that countless numbers of stars began forming so early after the birth of the universe could cause us to rethink a lot of our theories."

Lanzetta bases his conclusion on a new analysis of galaxies in the Hubble deep fields taken near the north and south celestial poles (in 1995 and 1998 respectively). He reports in an upcoming issue of the *Astrophysical Journal* that the farthest objects in the deep fields are only the "tip of the iceberg" of an effervescent period of star birth that is unlike anything the universe will ever see again. Lanzetta concludes that 90 percent of the light from the early universe is missing in the Hubble deep fields. "The previous census of the deep fields missed most of the ultraviolet light in the universe; most of

it is invisible," he says.

Based on an analysis of galaxy colors, Lanzetta concludes that the farthest objects in the deep fields must be extremely intense, unexpectedly bright knots of blue-white, hot newborn stars embedded in primordial galaxies that are too faint to be seen even by Hubble's far vision. It's like seeing only the lights on a distant Christmas tree and inferring the presence of the whole tree.

Likewise, Lanzetta deduced the total population of stars in the early universe based on observing only the brightest stars with the Hubble telescope. Because such far extrapolations are built on certain assumptions, this conclusion will require further analysis and observation.

Lanzetta next plans to use Hubble's Advanced Camera for Surveys, to be installed in early 2002, to look even deeper into the universe to try to directly verify some portion of the missing light. He will also look for very distant supernovae as an al-

ternate measure of star formation. "Because they are point sources of light, supernovae are not subject to the same cosmological brightness-dimming effects like galaxies (which are extended sources of light)," says Lanzetta.

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Headquarters, Washington

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The Association of Universities for Research in Astronomy, Inc. operates the Space Telescope Science Institute for NASA, under contract with the Goddard Space Flight Center, Greenbelt, Md. The Hubble Space Telescope is a project of international co-operation between NASA and the European Space Agency.

"Sherlock Holmes and Dr. Watson go camping, and pitch their tent under the stars. During the night, Holmes wakes his companion and says: 'Watson, look up at the stars, and tell me what you deduce.'

Watson says: 'I see millions of stars, and even if a few of those have planets, it's quite likely there are some planets like Earth, and if there are a few planets like Earth out there, there might also be life.'

Holmes replies: 'Watson, you idiot. Somebody stole our tent.'"

CALENDAR OF EVENTS

- January 11, 12, 18, 19
February 8, 9, 15, 16 **BINBROOK OBSERVING NIGHTS** - For confirmation or directions call Ann Tekatch 575-5433, Marg Walton 627-7361, Rob Roy 692-3245
- Friday, February 8, 7:30pm **HAA GENERAL MEETING** - The meeting will be at the Spectator Building auditorium.
- Friday, March 8, 7:30pm **HAA GENERAL MEETING** - The meeting will be at the Spectator Building auditorium.