

VILLAGES STAR

Newsletter of The Villages Astronomy Club

Volume 3, Number 1

January 2022

Club Website:

<http://vlgastroclub.org/>

Facebook:

<https://www.facebook.com/groups/vlgastroclub/>

Club Officers & Assistants

President Mark Graybill

Vice President Ken Katta

Secretary/Historian Burt Salk

Treasurer Linda Meng

Newsletter Contact

saundby@gmail.com

(please include TVAstro in subject line)

UPCOMING EVENTS

January 18th: General Meeting, Laurel Manor Recreation Center, 6:20pm

February 1st: Telescope Workshop. 5pm
Location announced via email list.

February 4th: Club Directors' Meeting, Laurel Manor Recreation Center, 12:00pm. Please note new day (Friday) and time.

February 15th: General Meeting, Laurel Manor Recreation Center, 6:20pm

February 25th-26th: Outdoor Expo, Everglades Recreation Center, 10am-3pm

March 1st: Telescope Workshop. 5pm
Location announced via email list.

March 11th: Starry Starry Day & Night, 2-5p and 6-9p, Site TBA, Mar 12th backup date.

Calendar: <https://vlgastroclub.org/events>

NEWS

Homestead Recreation Center

We expect that the grand opening of the Homestead Recreation Center and its telescope pads will come soon! The telescope pads are permanent observing locations placed in an area shielded from nearby light sources by surrounding trees.

Watch the email list for announcements of the grand opening ceremony. We expect to have solar observation and the Solar Walk during the day, and observation in the evening, weather permitting.

The Villages Outdoor Expo

The Villages Outdoor Expo will be held on Friday February 25th and Saturday February 26th from 10am to 3pm. This is an event where the clubs of The Villages that have outdoor activities can present themselves for those looking for new clubs and activities. We will have a booth at the expo, and hope to have solar observation and some of the Solar Walk on display.

Starry Starry Day and Night

Our next Starry Starry Day & Night will be on March 11th. We are hoping to site it at the new Homestead Rec Center observation area, stay tuned for details. March 12th will be the fallback date in the event of weather cancellation on the 11th.

The daytime event runs from 2-5pm, with the Solar Walk and solar observation. The evening event runs from 6-9pm with astronomers sharing telescopic views of the sky!

Keep the date open, and watch for announcements here and in the email group.



January Meeting

Come meet Albert Einstein at our January meeting! Albert Einstein comes alive and in costume to the January 18th meeting and tells about his remarkable life and numerous contributions to astrophysics. He will discuss relativity, the space time continuum, gravitational waves, quantum mechanics, gravitational waves, time dilation and black holes.

Drake Shepard will create this engaging experience for our members at the January meeting.

Future Meeting Presentations

February: John Dobson and His Telescopes by Mark Graybill

March: Astrophotography by Mick Groszko

April: Future Giant Telescopes by Ernie Rossie of Plantations Astronomy Club

May: Women of Science pt. 2 by Linda Meng

Directors' Meetings

The next Directors' Meeting will be held on January 28th at noon at the Laurel Manor Recreation Center.. All members are welcome to join us, to assist us with the planning and organization of the club, and in developing our plans for activities to help the club better serve its membership.

IN THE SKY THIS MONTH

The Moon:

1st Quarter, Jan 9th,

Full, Jan 17th,

Last Quarter, Jan 25th.

New, Feb 1st .

Mercury reaches greatest elongation (farthest distance from the Sun as seen from Earth) on the 7th. View it at dusk, because it sets early. It will be within 3 degrees of Saturn at dusk on the 9th as it begins its rapid journey back into the Sun's glare. In only a few days it will be too close to the Sun to observe, and won't reappear in dusk skies until April.

Venus leaves our evening sky, and has its solar conjunction (closest approach to the Sun, invisible to us) on January 8th. It reappears in the early morning sky starting on the 10th for early risers, joining planet **Mars**..

Jupiter will still be the showpiece of the evening sky through the month. It will be 35 degrees above the horizon at dusk at the start of the month, dropping to 21 degree by the end of the month. This month will be the last full month to get good telescopic views of Jupiter until after its solar conjunction in March.

Saturn is dimmer and lower in the sky than last month, moving closer to the Sun at its stately pace. Plan to observe it early in the month, at dusk and shortly afterward. By month's end it will be lost in the Sun's glare as it heads for its solar conjunction on Feb. 4th.

Neptune, Uranus, Ceres, and Pluto are all in the sky this month as well, and findable with finder charts online, or a planetarium program. At magnitude 5.8, Uranus can be seen in binoculars or a small telescope.

<https://theskylive.com/planetarium>

GALACTIC ARCHAEOLOGY

by Kenneth S. Katta, O.D., M.S., LtCol,
USAF(Retired)

My recent articles for the *Villages Star* have dealt with non-traditional but upcoming fields in Astronomy and Astrophysics. This is an attempt to acquaint the astronomer hobbyist with new fields of study that are published in the issues of *Sky and Telescope* and *Astronomy* to provide some degree of familiarity with astrophysical concepts for the lay reader. Such a new field is Galactic Archeology. This is a different field than Archeoastronomy which I have written about before.

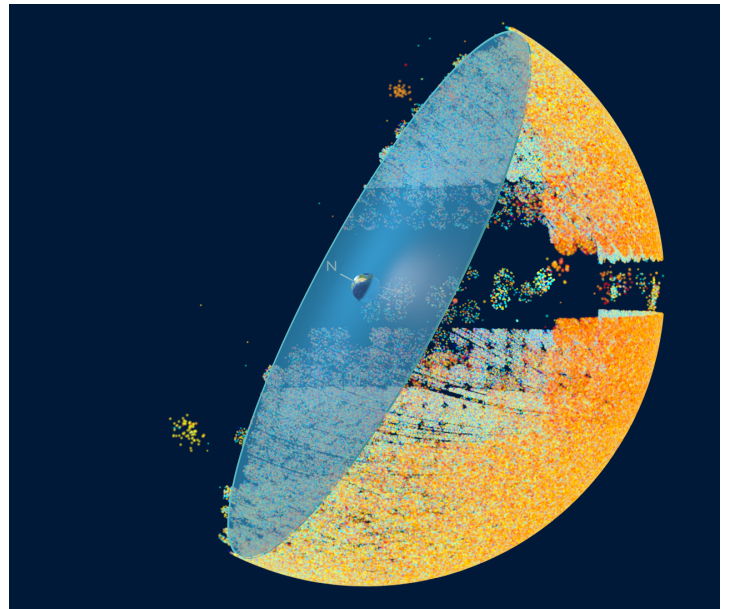
Archeoastronomy, a merger of archaeology and astronomy, is a field of study that relies heavily on historical adjustments that must be made to the positions of objects in the sky resulting from precession in which ancient structures were alligned with celestial objects. There is also Stellar Archaeology which is the study of the early history of the Universe, based on its early composition. Galactic Archeology is the study of the formation, evolution and structure of our Milky Way Galaxy.

Galactic archeologists treat individual Milky Way stars as “fossils” using their chemical and dynamical characteristics to trace our Galaxy's history and presentday structure. For instance, it was only in the 1990s that it was determined the Milky Way is a barred spiral galaxy, and that the abundance of metal-poor stars in the Galactic halo and small dwarf galaxies provide a wealth of information about the early Universe. In particular these old survivors allow for the study of the nature of the first stars and supernovae, the relevant nucleosynthesis processes responsible for the formation and evolution of the elements, early star and galaxy formation processes, as well as the assembly process of the stellar halo from dwarf galaxies a long time ago.

The Radial Velocity Experiment (*RAVE*) was set up as a pilot survey using 6df multi-object

spectrograph at the Anglo-Australian Observatory UK Schmidt telescope in Siding Spring, Australia which observed 100,000 stars during 2003-2005. Spectroscopy enables a measure of a star's radial velocity, which is one of the six-dimensional coordinates of position and velocity. This allows the study of the details of galactic dynamics. Spectroscopy also permits a measure of the abundances of chemical elements in a star's atmosphere. This holds important clues to the star's early chemical composition and subsequent metal enrichment of the interstellar medium. *RAVE* results include the determination of the minimum speed needed for a star to escape the gravitational pull of the Milky Way. Also results confirmed that dark matter, an invisible component of the Universe of yet unknown nature, dominates the mass of the Milky Way. This was the first of systematic spectroscopic Galactic Archaeology surveys. This provided new insights into the structure and composition of the Milky Way.

This data was complimented by cross-matches with *Gaia* DR2 catalog data release of the European Space Agency (ESA) mission *Gaia* which demonstrated good agreement with the *RAVE* data. (Continued next page.)



RAVE Observations of the Southern Hemisphere
Credit: AIP/K. Riebe, the RAVE Collaboration

The *Gaia* astrometry space mission has transformed our understanding of the Milky Way's stellar populations by reporting positions, proper motions, and parallaxes for stellar and galactic distance measurements of the 2.8 billion stars within and outside our Galaxy. It has enriched our view of the various stellar populations that make up our Galaxy.



The 6df Interchangeable Field Plate
 This plate features **150 retractable fibers, controlled via software to take measurements.**
 Credit: The RAVE Collaboration

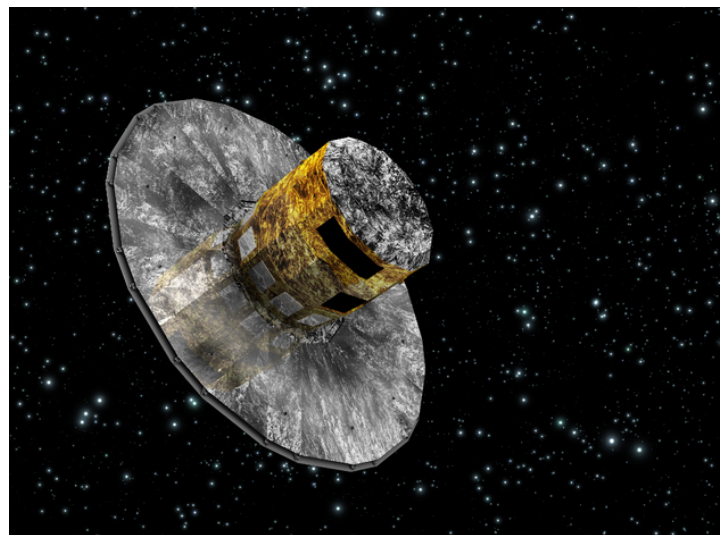
The next decade affords tremendous opportunity to achieve the goals of Galactic archaeology, to reconstruct the evolutionary narrative of the Milky Way. This will be based on empirical data that describes its current morphological, dynamical, temporal, and chemical structures. An ensemble of missions that are planned for the coming decade will build the map of our Galaxy. These will include *Sloan V's Milky Way Mapper*, *WEAVE*, *4MOST*, *GALAH*, *PFS*, *LAMOST* and *MOONS*. From these data comprising many millions of stars can be built a set of abundance measurements and ages, across a vast expanse of the Galaxy. These surveys will greatly enhance the results of *Gaia* with radial velocities, chemistry, and distances for dust-obscured stars in the inner Milky Way.

The critical observational objective is a Galaxy-scale, contiguous, comprehensive mapping of the Galaxy's disk's phase space,

tracing where the majority of the stellar mass resides. The primary and significant challenge within stellar astronomy and Galactic archaeology will be in fully utilizing this data. The current data has already transformed our understanding of our Galaxy in the past few years alone. The future proposed missions will enable us to truly see the Galaxy for the first time in its spatial, dynamical, chemical and temporal detail.

For more information on RAVE, visit the website at: <https://www.rave-survey.org/>

For more information on Gaia, visit the ESA's Gaia website at: <https://sci.esa.int/web/gaia>



Gaia Spacecraft. Credit: ESA



12 Rare Einstein Crosses Discovered by Gaia
 Credit: ESA

<https://sci.esa.int/web/gaia/-/12-rare-einstein-crosses-discovered-with-gaia>