Star Dust

Newsletter of National Capital Astronomers, Inc.

capitalastronomers.org

September 2022 ***Volume 81, Issue 1***

Celebrating 85 Years of Astronomy

Next Meeting

When: Sat. Sep, 10th, 2022

Time: 7:30 pm

Where: Online (Zoom)

See instructions for joining the meeting on Page 8.

Speaker: Dr. Quanzhi Ye

Table of Contents

Image Credit - NASA, ESA, CSA, STScI

Summer 2022 brought an incredible debut for the James Webb Space Telescope, providing images such as the one above of the Cartwheel Galaxy. A story is on Page 6 and more information on the image is available at www.nasa.gov/feature/goddard/2022/webb-captures-stellar-gymnastics-

Annual Membership Dues are Due

Please support NCA by joining or renewing your membership! The membership form, p7, can be printed and mailed in with a check. Or, you may also fill out it online and pay via PayPal! Thank you.

Messengers From Afar: Interstellar Small Bodies Passing Through the Solar System

Quanzhi Ye

University of Maryland

Image Credit -ESO/M. Kornmesser

The possibility of detecting extrasolar asteroids and comets passing through our Solar System has been discussed for several decades, but it is not until the last 5 years that the first two interstellar objects, 1I/'Oumuamua and 2I/Borisov, were discovered. Even though the statistics are still small, we have come to know that the two objects behave very differently from each other: 'Oumuamua is more consistent with an asteroid exhibiting non-gravitational accelerations, while Borisov is consistent with an ordinary Solar-System comet. I will review our knowledge about these two objects and discuss how they contribute to our knowledge of the small-body population in our own Solar System as well as the evolution of planetary systems.

Biography: Quanzhi Ye is an Assistant Research Scientist in the Department of Astronomy at the University of Maryland and a Visiting Researcher at Boston University. He is primarily interested in the small bodies of the Solar System, namely asteroids, comets and meteoroids. He earned a BS degree in atmospheric sciences at Sun Yat-sen University in Guangzhou, China, followed by his MS and PhD in

continued on page 2

in-the-cartwheel-galaxy

Recent Astronomy Highlights

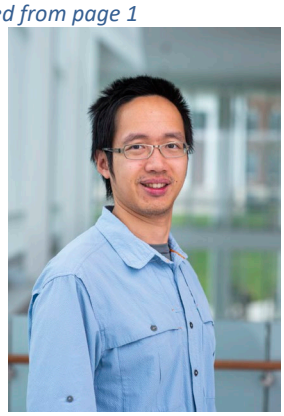
Source of Some Mysterious Short Gamma-Ray Bursts Discovered

Many short gamma-ray bursts were, until recently, thought to have originated in intergalactic space, possibly due to interactions of astronomical objects, such as the collisions of neutron-star pairs, that had been gravitationally ejected from their original nearby galaxies. However, astronomers using data from a number of telescopes, including the two Gemini Telescopes, one located in Hawaii and one in Chile, were able to confirm that the some of the bursts were actually coming from galaxies far away, up to 10 billion light years away, and therefore too dim to see previously. Evidence of such neutron-star collisions so early in the Universe has implications for theories of the chemical evolution of galaxies. More information can be found at cmns.umd.edu/news-events/features/4958

An Extrasolar Waterworld?

An exoplanet designated TOI-1452 b, may be a world covered in an ocean, according to recent studies. The first clue of the candidate ocean world came from TESS, Transiting Exoplanet Survey Satellite, which searches for small changes in the brightness of 200,000 of the brightest stars near Earth. TESS found just such a decrease in brightness in the star TOI-1452, part of a binary-star system, every eleven days. Based on the magnitude of that decrease, astronomers estimated that the planet would be 70% larger than Earth. Subsequent studies, using a number of telescopes including the OMM,
Observatoire du Mont-Mégantic, in eastern Canada and the Canada-France-Hawaii Telescope in Hawaii, determined that the mass of the planet is approximately five times that of Earth. Based on those size and density measurements, as well as the distance of its orbit from its host star, TOI-1452 b could very well be a world covered by an ocean. Further studies will no doubt take place. More information can be found at phys.org/news/2022-08-extrasolar-

Abstract and Biography – continued from page 1



Astronomy at the University of Western Ontario, Canada, where he used telescopes, meteor radar and numerical code to study meteor showers and their parent comets. He then conducted postdoctoral research at Caltech, using the Zwicky Transient Facility to search for near-Earth objects and comets, before starting as a research faculty member at the University of Maryland in 2019. In his spare time, he is an avid stargazer and plays viola at various chamber music groups.

2022 NCA Speakers' Schedule

John Hornstein

Sep 10 Quanzhi Ye (U. Maryland) **Messengers From Afar: Interstellar Small Bodies Passing Through the Solar System**

Oct 8 Rita M. Sambrunna (Goddard's Space Flight Center) **Multimessenger Astronomy**

Nov 12 Jens Barosch (Carnegie Earth & Planets Laboratory) **Presolar Stardust in Asteroid Ryugu**

Dec 10 Joe Pesce (George Mason University) **What We Are Discovering With ALMA and The James Webb Space Telescope?**

Double Asteroid Redirection Test (DART) Impact Happens This Month

September 26th at 7:14 p.m. EST, the DART spacecraft is set to crash into the asteroid Dimorphos, part of a binary asteroid system along with its larger asteroid companion, Didymos. Dimorphos is approximately 524 feet, 160 meters, in diameter, while Didymos is 2,500 feet, 780 meters, in diameter. The collision is an experiment to determine if such an impact in the future could be used to divert the trajectory of any potential Earth-intercepting asteroid. A binary asteroid was chosen as a target because Didymos's orbit of Dimorphos is much slower than the orbits of asteroids around the Sun, so the small change in orbital speed due to the impact should be observable much more quickly. LICIACube, a CubeSat, provided by the Italian Space Agency (ASI), which has hitched a ride of DART, will be released prior to September 26th and will take images of the impact and any resulting dust cloud and impact crater.

NCA has a connection to the mission in the persons of David and Joan Dunham, who have been involved in observing occultations of the asteroid pair on a number of occasions to precisely determine its orbit of

continued on page 4

Exploring the Sky

Exploring the Sky is a joint public observing program between the National Capital Astronomers and the National Park Service. We have been holding these sessions for more than 70 years. We supply the telescopes and you supply the eyes. We meet in the field just south of the intersection of Military and Glover Roads, NW, near the Rock Creek Park Nature Center. A parking lot is located next to the field. The sessions will be canceled in the event of rain or cloudy skies.

Although this is not an optimal observing site, many of the objects people are interested in looking at are visible. At times we can see some of the planets, double stars, open clusters, globular clusters, the occasional comet or asteroid, nebulae and fuzzy galaxies. The latter two will never look like the magazine pictures!

Remaining 2022 Exploring the Sky Sessions

1 Oct. 7:30 p.m. – Moon, Jupiter, Saturn

5 Nov. 7:00 p.m. - Moon, Pleiades, Jupiter, Saturn

More information can be found at NCA's web site, www.capitalastronomers.org or the Rock Creek Park web site, www.nps.gov/rocr/planyourvisit/expsky.htm. You can also call the Nature Center at (202) 895-6070. For general information on local astronomical events visit www.astronomyindc.org.

The article-submission deadline for October's issue of Star Dust, is September 18th.

Clear Skies!

President's Corner

Guy Brandenburg

Welcome to a new year of Star Dust, ten more astronomical lecture meetings, and numerous outreach possibilities.

When I volunteered to run for president of National Capital Astronomers last June, I was rather apprehensive about taking on such a huge responsibility, but I wanted to make sure that the club that included as members Vera Rubin and Nancy Grace Roman, and which taught me how to make telescopes, will continue to thrive, as we emerge from the COVID pandemic. Our goal, as before, is to continue to let the public learn about new findings about the workings of the Universe and our connections to it, and to see distant objects for themselves with our telescopes.

There are a few changes ahead:

1. We will no longer mail out paper copies of Star Dust. If you need printed copies, feel free to print them out yourself.

2. Our former Secretary-Treasurer, Henry Bofinger, has unfortunately become totally disabled because of a fast-moving and incurable disease similar to Parkinson's. Fortunately, Jim Simpson has graciously volunteered to take over that position, has received the NCA's paper financial records from Henry's wife, and has been duly authorized by our bank. Jeffrey Norman remains as our assistant Secretary-Treasurer.

3. Thanks to the efforts of Elizabeth Warner, Michael Laugherty, and Jim Simpson, you now have the option of renewing your NCA membership (or joining for the first time) either online or by writing a check and mailing it in, the old-fashioned way.
   a. If you choose the latter, the check should be payable to National Capital Astronomers. Along with the check, print out and fill in the membership form on page 7 of this newsletter. Mail both to Jim Simpson, NCA Treasurer, 3845 Wayson Road, Davidsonville MD 21035.
   b. If you choose the online option, aim your browser to CapitalAstronomers.org, and follow the instructions in the right column; you can pay via PayPal, Venmo, or the credit card of your choice. A one-year regular membership remains $10, a 3-year membership is $25, and life membership is $200. Student membership is still $5 per year.

4. Exploring the Sky has started back up again, with the participation of National Park Service rangers, at its usual location near Glover and Military Roads in Rock Creek Park, on the first Saturday of each month. We need both telescopes and volunteers for this.

5. We need a volunteer to help direct new and renewing members to the activities in which they are most interested in participating.

continued on page 4

Sky Watchers

September/October

Mercury will transit from the evening to the morning sky in mid September and reach Greatest Western Elongation on October 8th (see below). Venus will appear lower in the morning sky as days progress. Saturn will be in the eastern sky after sunset, with Jupiter rising shortly after sunset in the early part of September before reaching opposition on Sept. 26th (see below). Mars joins the gas giants well after sunset, rising before midnight.

9/10	Full Moon – 5:58 a.m.
9/22	Autumnal Equinox – 7:55 p.m.
9/26	Jupiter reaches Opposition meaning that Earth will be at its closest point to the gas giant. Jupiter will rise at sunset and be visible throughout the entire night.
10/7	The Draconids Meteor Shower peaks in the evening with approximately 10 meteors/hour. Unfortunately, a nearly full Moon will interfere with viewing this year. (Best viewing for this meteor shower is usually in the early evening, unlike with other meteor showers when it is during the pre-dawn hours of the night.)
10/8	Mercury reaches Greatest Western Elongation – The planet will be 18° from the Sun in the morning sky.

All times are in EDT (Eastern Daylight Savings Time)

President's Corner – continued from page 3

6. Because of cutbacks at the DC Department of Parks and Recreation, the long-running Telescope Making, Modification and Maintenance workshop which I've been running since about 2001 closes earlier than in the past: the hours are only 5:00 to 7:30 pm. The workshop continues to take place on Tuesday and Friday evenings, and occurs at the Chevy Chase Community Center, 5601 Connecticut Avenue, NW, DC 20016.

7. For the time being, our meetings will continue to be all-virtual, but we are investigating possible physical meeting spaces. If anybody has suggestions for such a venue, please let your officers know.

Double Asteroid Redirection Test (DART) Impact Happens This Month – continued from page 2

the Sun. They will also be involved in observing additional occultations in the aftermath of the collision in order to help precisely determine how much the impact affected Didymos's orbit and the overall trajectory of the asteroids. More information on those efforts is at occultations.org/publications/rasc/2022/nam22NEAoccs.htm and occultations.org/publications/rasc/2022/nam22NEAoccs.pdf.

More information on the DART mission can be found at www.msn.com/en-us/news/technology/nasas-asteroiddeflecting-test-mission-is-just-1-month-away-from-impact/ar-AA117QGA

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Editor: Todd Supple

Editorial Advisors:

- Michael Chesnes
- John D. Gaffey, Jr.
- Jeffrey Norman
- Elizabeth Warner
- Wayne Warren
- Marjorie Weissberg
- Harold Williams

Electronic Distributor: Jay Miller

Recent Astronomy Highlights – continued from page 2

Betelgeuse Recovering From an Enormous Surface Mass Ejection

Astronomers estimate that part of the atmosphere of the red giant, Betelgeuse, weighing several times the mass of the Moon, was ejected from the star in 2019, a never-before-seen event called a Surface Mass Ejection, SME. For perspective, this is about 400 billion times the mass ejected by an average Coronal Mass Ejection, CME, from our Sun. The dust cloud that formed from the cooling of the material from the SME is credited with causing the decrease in brightness of the star observed in the months that followed. One theory is that the SME was caused by an enormous convective plume rising to the surface of the star. Such SMEs may be typical events in the lives of red giants as they progress toward supernova. Astronomers note that, despite the magnitude of the SME, there is no evidence that Betelgeuse will go supernova anytime soon. Meanwhile the photosphere of the star is still recovering. In addition, the 400-day cycle of brightening and dimming that has been observed for 200 years seems to have stopped, at least temporarily, as the star still vibrates from the ferocity of the outburst. More information on what astronomers are finding is available at www.nasa.gov/feature/goddard/2022/hubble-sees-red-supergiant-star-betelgeuse-slowly-recovering-after-blowing-its-top.

continued on page 7

Occultation Notes

- D following the time denotes a disappearance, while R indicates that the event is a reappearance.
- The times are for Greenbelt, MD, and will be good to within +/-1 min. for other locations in the Washington-Baltimore metropolitan areas unless the cusp angle (CA) is less than 30 deg., in which case, it might be as much as 5 minutes different for other locations across the region.
- Some stars in Flamsteed's catalog are in the wrong constellation, according to the official IAU constellation boundaries that were established well after Flamsteed's catalog was published. In these cases, Flamsteed's constellation is in parentheses and the actual constellation is given in the notes following a /.
- Mag is the star's magnitude.
- % is the percent of the Moon's visible disk that is sunlit, followed by a + indicating that the Moon is waxing and - showing that it is waning. So 0 is new moon, 50+ is first quarter, 100+ or - is full moon, and 50- is last quarter. The Moon is crescent if % is less than 50 and is gibbous if it is more than 50. E indicates a lunar eclipse is in progress, and the value is the percent of the Moon's disk that is NOT in the umbra. So 0E means during the total phase.
- Cusp Angle is described more fully at the main IOTA Web site.
- Sp. is the star's spectral type (color), O,B,blue; A,F,white; G,yellow; K,orange; M,N,S,C red.
- Also in the notes, information about double stars is often given. "Close double" with no other information usually means nearly equal components with a separation less than 0.2". "mg2" or "m2" means the magnitude of the secondary component, followed by its separation in arc seconds ("), and sometimes its PA from the primary. If there is a 3rd component (for a triple star), it might be indicated with "mg3" or "m3". Double is sometime abbreviated "dbl". Often, rather than the separation, I give “dTime” or “dT”, the time difference of the secondary star occultation relative to the primary star’s occultation.
- Sometimes the Axis angle (AA) is given. It is the angle measured around the Moon's disk, from the Moon's axis of rotation. It can be used with a lunar map to tell where a star will reappear relative to lunar features.

Mid-Atlantic Occultations

David Dunham

Planetary and Asteroidal Occultations

2022 Date	Day	EDT	Star	Mag.	Asteroid	dmag	dur. s	Ap. "	Location
Sep 13	Tue	1:17	4UC53505486	11.9	Uranus	0.0	92m	9	N. Amer.,w. Eur.
Sep 13	Tue	1:39	4UC55312537	13.4	Goberta	2.2	3.5	9	NJ,sePA,nMD,nVA
Sep 14	Wed	3:54	4UC60830686	13.8	Theotes	4.8	2.2	9	sc-nVA,DC,cMD,NJ
Sep 14	Wed	4:58	4UC58432767	13.8	Geometria	1.5	1.5	9	nVA,DC,cMD,sNJ
Sep 21	Wed	4:01	4UC53224431	11.9	Comas Sola	3.7	1.5	5	sOH,sw-ePA,nNJ
Sep 22	Thu	5:02	4U490144782	12.3	Bagould	3.8	0.8	6	cVA,KY,OK,sAZ
Sep 23	Fri	1:14	4U389133432	14.2	Tombaugh	1.2	11	9	sNJ,nMD,sPA,cOH
Sep 24	Sat	2:36	SAO 192043	9.1	Brasilia	5.9	4	4	nc-swPA,e-swOH
Sep 24	Sat	4:45	TYC07301190	11.1	Flammario	2.1	6	4	cOH,sPA,nMD,cNJ
Sep 24	Sat	22:30	4U345164371	11.9	Nora	2.8	2.2	6	cOH,wc-nePA,eNY
Sep 25	Sun	23:50	4U377157090	13.8	Feronia	0.3	7	9	sOH,sPA,nMD,nVA
Sep 27	Tue	4:27	4UC55035798	14.2	Cava	0.4	5	10	nVA,DC,nMD,cNJ
Sep 27	Tue	4:28	4U549145662	13.3	2000 RS100	4.7	1.2	8	sNJ,nMD,nWV,cOH
Sep 28	Wed	23:15	4U570129882	13.9	Ricarda	0.7	2.3	9	sNJ,e+sMD,cVA
Sep 30	Fri	1:02	4UC59616745	13.7	Natalie	2.2	6	9	seVA,eMD,ePA;DC?
Sep 30	Fri	22:13	4U377136068	13.8	Ithaka	3.0	0.7	9	nVA,ne-cMD,sNJ
Sep 30	Fri	22:25	4U337195770	13.5	Haremari	2.7	4	9	cVA,sw-neMD;DC?
Sep 30	Fri	22:58	TYC62921626	11.4	Charlesgreen	6.9	0.7	6	w+nVA,DC,cMD,sNJ
Oct 4	Tue	3:44	4UC55540988	10.4	2002 TA295	8.8	0.7	4	sOH,nVA,nMD,sNJ
Oct 5	Wed	22:08	4U355123708	14.0	Runk	5.1	.8	12	nVA,DC,cMD,sNJ
Oct 6	Thu	2:44	4UC57143273	14.2	Zelinda	0.2	6	12	c+nVA,DC,MD,NJ
Oct 7	Fri	1:51	4UC47501745	13.1	Davegault	3.7	1.3	8	sNJ,cMD,nDC,nVA
Oct 7	Fri	21:24	4&417134348	13.7	Deiphobus	2.4	23	8	nwTX,OK,TN,sVA
Oct 8	Sat	23:59	TYC17302044	11.2	Leonora	1.9	10	4	ne-cwPA,ce-sw

Lunar Grazing Occultations

2022 Date	Day	EDT	Star	Mag	%	alt	CA	Location, Notes
Sep 19	Mon	1:47	SAO 78784	8.3	37-	14	13N	RuthrGlen,VA;Oakvill,Dentn,MD
Sep 22	Thu	5:07	ZC 1408	7.4	12-	20	11N	Pitsbrg,Indiana,Oval,Daltn,PA

Lunar Total Occultations

2022 Date	Day	EDT	Ph	Star	Mag	%	alt	CA	Sp.	Notes
Sep 13	Tue	5:33	R	Torcular	4.3	90-	49	71N	K0	ZC 257=omicronPsc,dbl?
Sep 15	Thu	0:47	R	SAO 93376	7.5	75-	34	51S	G0	maybe close double
Sep 15	Thu	23:03	R	39 Tauri*	5.9	66-	8	39N	G5	Az 68,ZC 601,close dbl?
Sep 15	Thu	23:43	R	SAO 76456	7.9	66-	15	86N	K2	Azimuth 74 degrees
Sep 16	Fri	2:56	R	ZC 621*	6.1	65-	51	43S	B9	Spectroscopic binary
Sep 16	Fri	3:59	R	SAO 76510*	8.2	65-	63	76S	A0	
Sep 17	Sat	2:13	R	ZC 753	7.4	56-	35	46S	G8	
Sep 18	Sun	0:35	R	ZC 889	8.1	47-	9	83N	B3	Azimuth 64 degrees
Sep 18	Sun	0:58	R	SAO 77697	8.3	47-	13	81S	B2	Azimuth 67 degrees
Sep 19	Mon	6:42	R	SAO 78916	8.4	35-	68	87N	G5	Sun altitude -3 degrees
Sep 20	Tue	2:45	R	76 Gem	5.3	28-	14	82N	K5	Azimuth 68, ZC 1169
Sep 22	Thu	5:21	R	ZC 1408	7.4	12-	21	41N	K3	close double? PA graze
Sep 29	Thu	19:51	D	SAO 183608	7.7	18+	10	18S	K0	Azimuth 231 degrees
Oct 2	Sun	19:19	D	SAO 187125	8.0	49+	23	81N	K0	Sun alt. -7 deg.
Oct 2	Sun	20:43	D	SAO 187180	8.2	50+	19	43S	K0	
Oct 2	Sun	21:30	D	SAO 187225	8.3	50+	15	85S	B9	Azimuth 212 deg.
Oct 3	Mon	19:59	D	ZC 2885	7.6	61+	24	41S	K0	
Oct 3	Mon	22:13	D	SAO 188613	7.5	62+	18	73N	G8	
Oct 4	Tue	22:35	D	ZC 3052	6.4	73+	24	66S	K0	mag2 8.6, dTime -0.8s
Oct 5	Wed	20:15	D	SAO 164654	7.7	82+	27	70N	F6	

*in Kepler2 program so occultation light curves are sought.

More information at http://iota.jhuapl.edu/exped.htm.
Sometime soon, the URL will change to https://iota.jhuapl.edu/exped.htm.

David Dunham, dunham@starpower.net

2022-2023 Officers

President:
Guy Brandenburg
gfbrandenburg@yahoo.com
202-635-1860 (leave message)

Vice-President:
John Hornstein
jshgwave@yahoo.com
301-593-1095 (h)

Secretary-Treasurer:
Jim Simpson
simpsonj@verizon.net
240-232-2820

Asst. Secretary-Treasurer:
Jeffrey B. Norman
jeffreynorman@comcast.net

Trustees:
- Michael Chesnes (2023)
- Jack Gaffey (2024)
- Benson Simon (2025)
- Michael Brabanski (2026)

Appointed Officers and Committee Heads:

Exploring the Sky
Jay Miller
jhmiller@me.com

Telescope Making
Guy Brandenburg
gfbrandenburg@yahoo.com
202-635-1860 (leave message)

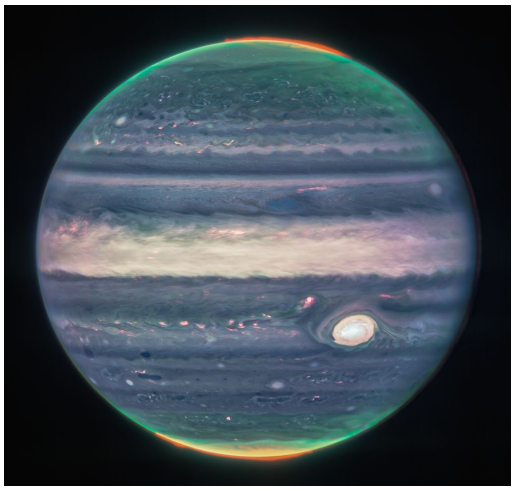
NCA Webmaster
Elizabeth Warner
warnerem@astro.umd.edu
301-405-6555

Star Dust Editor
Todd Supple
NCAStardust@gmail.com
301-595-2482 (h)

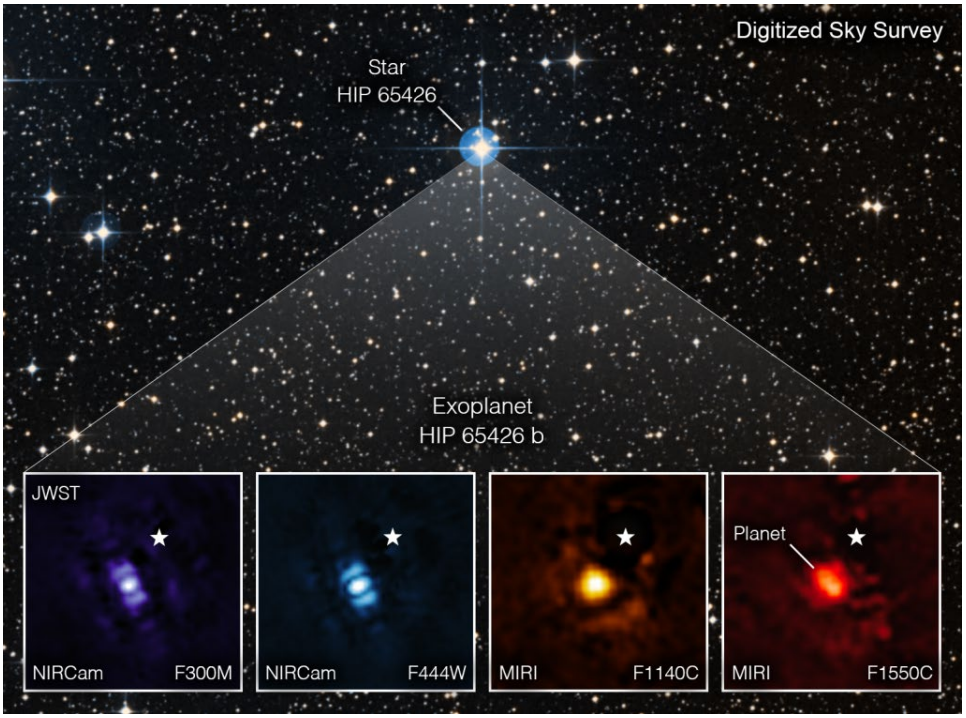
Social Media
Twitter: @NatCapAstro

JWST – Images and Discoveries Galore

Summer 2022 may hold different memories for many people, but for astronomers and astronomy enthusiasts, it has been the summer of the James Webb Space Telescope. From within our own solar system to an exoplanet in another system and even much farther out in the Universe, JWST's images have definitely dazzled and surprised. A few of those images are shown below and on the last page. A gallery of additional images can be found at webbtelescope.org/resource-gallery/images?Collection=First%Images.



Jupiter and its auroras. Image Credit - Credit: NASA, ESA, CSA, Jupiter ERS Team; image processing by Judy Schmidt. More information is at blogs.nasa.gov/webb/2022/08/22/webbs-jupiter-images-showcase-auroras-hazes/



Exoplanet HIP 65426 b as seen in different wavelengths and cameras on the James Webb Space Telescope. More information about the four images can be found at blogs.nasa.gov/webb/2022/09/01/nasas-webb-takes-its-first-ever-direct-image-of-distant-world/. Image Credit - NASA/ESA/CSA, A

Recent Astronomy Highlights – continued from page 4

Possible Explanation of Geological Activity on Ceres

At only a little over one percent of the mass of Earth's Moon, the dwarf planet Ceres was long considered to be too small to have supported much geological activity. So, imagine the surprise of astronomers when the Dawn spacecraft discovered evidence of cryovolcanism, volcanoes spewing water vapor and other low-temperature volatiles, and other geological activity. Where had the energy for such activity come from? A new model has given a possible answer – the heat that comes from the decay of radioactive materials, such as uranium and thorium, within the dwarf planet. This energy would have heated up the Ceres enough for geological activity to have taken place, perhaps even creating oceans on the surface, oceans that have long since frozen. More information is at phys.org/news/2022-08-reveals-dwarf-planet-ceres-powers.html.

Calendar of Events

NCA Telescope Making, Maintenance, and Modification Workshop (TM3W) (previously the NCA Mirror- or Telescope-making Classes): The Chevy Chase Community Center has reopened and classes have resumed. Classes will be Tuesdays and Fridays, from 5:00 to 7:30 pm at the Chevy Chase Community Center (intersection of McKinley Street and Connecticut Avenue, N.W.) Please contact instructor Guy Brandenburg at 202-635-1860 (leave message) or at gfbrandenburg@yahoo.com if you plan to attend. Note that masks are mandatory, as in all DC government buildings. More info is at guysmathastro.com.

Open house talks and observing at the University of Maryland Observatory in College Park are temporarily suspended. When they resume, they will be on the 5th and 20th of every month at 8:00 pm (Nov.-Apr.) or 9:00 pm (May-Oct.). Updates are posted at www.astro.umd.edu/openhouse.

Next NCA Meeting: **8 October** 7:30 p.m. Rita M. Sambrunna, Goddard's Space Flight Center**, Multimessenger Astronomy**

The APS Mid-Atlantic Senior Physicists Group: **(Zoom Meeting)** September 28th at 1:00 p.m., Dr. Michael C.F. Bazzocchi, Clarkson University, will give a talk entitled "Asteroids: Stepping Stones to the Future of Space Exploration". **Please note that this is the 4th Wednesday of the month, not the 3rd.** You can register and receive the Zoom link for the meeting at apsphysics.zoom.us/meeting/register/tZAqc-goqDIuE9JldRS91ezmMJ4Q8RxPy1Ji. More information is available at www.aps.org/units/maspg/meetings/meeting.cfm?name=SENIOR0922.

National Capital Astronomers Membership Form

Name: _____ **Date:** ___/___/___

Address: _____ **ZIP Code:** _____

Home Phone: ____-____-_____ **E-mail:** _____ **(necessary for delivery of Star Dust)**

Membership (circle one): Student….. $ 5; Individual / Family…..$10; Optional Contribution…..$__

Please indicate which activities interest you:

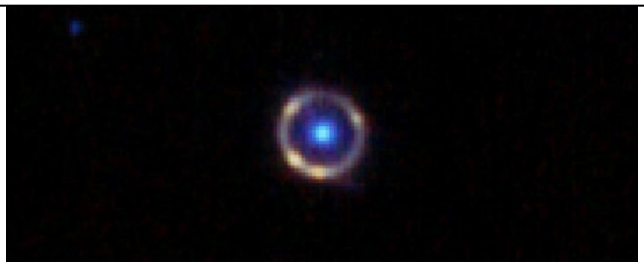
- Attending monthly scientific lectures on some aspect of astronomy ____
- Making scientific astronomical observations ____
- Observing astronomical objects for personal pleasure at relatively dark sites ____
- Attending large regional star parties ____
- Doing outreach events to educate the public, such as Exploring the Sky ____
- Building or modifying telescopes ____
- Participating in travel/expeditions to view eclipses or occultations ____
- Combating light pollution ____

Do you have any special skills, such as videography, graphic arts, science education, electronics, machining, etc.?

Are you interested in volunteering for: Telescope making, Exploring the Sky, Star Dust, NCA Officer, etc.?

Please mail this form with check payable to ***National Capital Astronomers*** to:
Jim Simpson, NCA Treasurer; 3845 Wayson Road, Davidsonville, MD 21035

Celebrating 84 Years of Astronomy



A nearly perfect Einstein Ring approximately 12 billion light years away. *Image Credit - JWST/MAST; Spaceguy44/Reddit.* More info is available at www.sciencealert.com/webb-has-snapped-an-almost-perfect-einstein-ring-12-billion-light-years-away.

To join or renew online, visit capitalastronomers.org and look in the right column for the Membership Form and PayPal links.

Next NCA Meeting:

2022 September 10th
7:30 pm
(On Zoom)
Dr. Quanzhi Ye

To join the Zoom meeting, use the following link: umd.zoom.us/j/98702044833?pwd=UTg1bFJpMmxvcXpEUGtUcDNmZnNrdz09

Please download and import the following iCalendar (.ics) files to your calendar system: umd.zoom.us/meeting/tJwqd-uoqj8iGdfUoJKHH8U2tt2u7lPmVFFS/ics?icsToken=98tyKuCgqTsoGtCRuBqERow-B4iga_TwiClHjadbqRDPKAh7OjakIvYQJ-VzlNXm

Please note that NCA Zoom meetings are often recorded.

Inside This Issue