Star Dust

Newsletter of National Capital Astronomers, Inc.

capitalastronomers.org

April 2020 ***Volume 78, Issue 8***

Celebrating 83 Years of Astronomy

The April 11, 2020 meeting of the National Capital Astronomers has been cancelled. (See right.)

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(Please note – The April 2020 issue of Star Dust is digital only and has more pages than the usual format.)

Image of the Moon crossing the Earth taken by NASA's Earth Polychromatic Imaging Camera (EPIC) on the Deep Space Climate Observatory in 2015. Image Credit: NASA/NOAA. A larger copy of the image can be viewed at https://explorer1.jpl.nasa.gov/galleries/earth-from-space/#gallery-16.

April National Capital Astronomy Meeting Is Cancelled and Scheduled Talks Are Postponed

Because of the ongoing coronavirus pandemic, the University of Maryland Observatory has been closed until further notice. Therefore, the April meeting of NCA has been cancelled. John Hornstein, Vice President of NCA, reports the following regarding the talks that were scheduled:

Tony Farnham (UMd) **A Cometary Outburst, Watched As It Develops**, is being rescheduled from Mar 14, 2020 to a date to be determined, in the Spring of 2021.

Bethany Cobb Kung (GWU), **Shedding Light on Gravitational Waves**, has been rescheduled from Apr 11, 2020 to Dec 12, 2020.

Joe Helmboldt (NRL), **Radio Astronomy Observes the Earth's Ionosphere**, is provisionally still scheduled for May 9, 2020, but it will be rescheduled if it becomes apparent that the Observatory will remain closed during May.

We'll get through the dark days. And we'll be back.
Image Credit – Elizabeth Warner

Recent Astronomy Highlights

Sometimes when astronomers are looking for one thing, they end up finding another. The first two articles point to just such instances of unexpected discoveries.

Teardrop Star

Using data from TESS, Transiting Exoplanet Survey Satellite, astronomers have discovered a star shaped like a teardrop. The star, designated HD74423 is part of a binary star system. It is about 1.7 times the mass of the Sun and its companion is a red dwarf. HD74423 is tidally locked in its orbit with the red dwarf, causing one side to be pulled out, creating the tear-drop shape, which results in one side of the star being less luminous than the other. Curiously, the scientists are not sure whether the side facing the red dwarf or the side facing away is the less luminous, but they hope to make a determination with further study of the system. More information, and a link to the paper published in *Nature Astronomy* by the team that made the discovery, can be found at https://www.mentalfloss.com/article/620505/unique-teardrop-star-discovered-nasa-satellite

Over a Hundred Trans-Neptunian Objects Discovered

The Dark Energy Survey, carried out at an observatory in Chile, was designed to discover and study extremely distant supernovae in an attempt to characterize the mysterious dark energy causing the accelerated expansion of the Universe. But as a bonus, a search of the survey's database has turned up evidence of over a hundred trans-Neptunian objects. Such objects are minor planets or dwarf planets that orbit the Sun beyond Neptune. The distances of the objects from the Sun vary from 30 to 90 AU, an AU or Astronomical Unit being the average distance of the Earth from the Sun. More information about the multiple discoveries can be found at https://www.universetoday.com/145367/over-a-hundred-new-large-objects-found-in-the-kuiper-belt/

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Online Astronomy Resources

While NCA talks have been postponed, there are still a lot of resources available on the internet to learn more about astronomy. Below is a brief, list of some of those resources. If you have resources you consider worthwhile, please consider sending them to the Star Dust editor, NCAStardust@gmail.com, for inclusion in future issues.

Past NCA Talks

Rupert Chapelle has created a playlist on YouTube that currently contains thirteen of the past NCA talks. The link to that playlist is https://www.youtube.com/playlist?list=PLZgJ7edbn3gpFYwzNzNsB2yo9u1vHrNyY.

From "An Evening With Isaac Newton" by Dean Howarth and Rachel O'Connell
Image captured from the video by Rupert Chapelle, Harold Williams, et al.

Colloquia at NASA's Goddard Space Flight Center

John Hornstein

Although future Science Colloquia at NASA's Goddard Space Flight Center have been put on hold, Goddard has recorded videos of past colloquia. Those videos can be viewed online by following the instructions below:

1 - Go to https://scicolloq.gsfc.nasa.gov/

2 - Above the words 'Current Schedule', click on the hyperlink (in blue) for the combination of season and year (e.g., Spring 2019) that you are interested in. (Surprisingly, none of the videos for Fall 2019 nor for Spring 2020 are yet available.)

3 - For the talk that you want to watch, click on the 'V' in the right-hand column. If there is no 'V', then no video is available for that talk.

Presentations Geared Toward the General Public

NASA Television channel has videos on space exploration and other subjects, plus links to other channels for the organization's various facilities. https://www.youtube.com/user/NASAtelevision

Deep Field: The Impossible Magnitude of Our Universe – a 20-minute tour of the Universe which includes stunning images and accompanying music. https://www.youtube.com/watch?v=yDiD8F9ItX0

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Exploring the Sky

*"**Exploring the Sky**"* is an informal program that, for over 70 years, has offered monthly opportunities for anyone in the Washington area to see the stars and planets through telescopes from a location within the District of Columbia. Presented by the National Park Service and National Capital Astronomers, sessions are held in Rock Creek Park once each month on a Saturday night from April through November, Beginners (including children) and experienced stargazers are all welcome—and it's free!

Hosted by: National Capital Astronomers, Inc and Rock Creek Park

2020 Exploring the Sky Sessions
(The session previously scheduled for 25 April has been cancelled.)
23 May 9:00 p.m.
27 Jun. 9:00 p.m.
25 Jul. 9:00 p.m.
22 Aug. 8:30 p.m.
26 Sep. 8:00 p.m.
24 Oct. 7:30 p.m.
7 Nov. 7:00 p.m.
(Objects to be viewed will be listed in future issues of Star Dust.)

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 May's issue of Star Dust, is April 21st.

Clear Skies!

Sky Watchers

April/May

Venus continues to dominate the evening sky, while all of the other visible planets – Mercury, Mars, Jupiter and Saturn - can be seen in the pre-dawn sky until Mercury transits back to the evening sky in early May heading toward a close conjunction with Venus in the latter part of the month (more on that in the May/June Sky Watchers).	
4/22-23	The Lyrids Meteor Shower peaks with approximately 20 meteors per hour. With the Moon being just past new, conditions will be ideal for viewing most of the night of the 22nd into the morning of the 23rd.
5/6-7	The Eta Aquarids Meteor Shower peaks with approximately 30 meteors per hour. Unfortunately. the nearly full Moon will make it difficult to see all except the brightest meteors.
5/7	Full Moon (and Supermoon) at 6:45 a.m.

All times are in EDT (Eastern Daylight Savings Time)

Comet Atlas

Discovered by the Automated Terrestrial-Impact Last Alert System (ATLAS) survey just a little over three months ago, Comet Atlas (C/2019 Y4) is already causing excitement as it continues to brighten, possibly becoming visible to the naked eye in northern skies in May 2020. As of the time this article is being written, the comet is visible only with a medium-sized telescope as it makes its way through Ursa Major. But since mid-February the comet has brightened from magnitude 14 to

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Comet Atlas (C/2019 Y4) Image Credit: Martin Gembec - Licensed for free use under the Creative Commons Attribution-Share Alike 4.0 International License, https://creativecommons.org/licenses/by-sa/4.0/legalcode. No changes were made to the image.

Comet Atlas – continued from page 3

magnitude 8, which translates to a 250-times increase in brightness. Seeing such brightening so far, some astronomers are predicting that Comet Atlas could become brighter than Venus, although many are more conservative in their estimates. Comets are notoriously unpredictable – perhaps the brightening will plateau, or if enough surface material burns off, it may even dim. It could also disintegrate as it gets closer to the Sun, which is what happened to Comet ISON in 2013. Barring the latter, Comet Atlas will come closest to Earth on May 23, 2020, 'close' still being approximately 73 million miles away. Afterward it will reach perihelion, or closest approach to the Sun, on May 31st, approaching to within 0.25 astronomical units.

It is interesting to note that Comet Atlas's approximately 5500-year orbit is remarkably similar to that of the Great Comet of 1844, leading to speculation that the two comets are actually fragments of a larger parent body.

So, will Comet Atlas be another Comet ISON or a repeat of the Great Comet of 1844 or somewhere in between? We'll just have to wait and see. More information, including finder charts of the comet's position in the sky over the next three months, is available at http://www.cometwatch.co.uk/comet-atlas-could-reach-naked-eye-brightness/.

Online Astronomy Resources – continued from page 2

Light Falls: Space, Time and an Obsession of Einstein – a PBS production, using drama and projection to explain the implications of Einstein's General Relativity. It was presented in the 100th- anniversary year of the solar eclipse that provided proof of Einstein's theory and is hosted by theoretical physicist and author Brian Greene. https://www.youtube.com/watch?v=Q1y3YnPgaY4.

Space Time – A production of PBS Digital Studios, Space Time presents videos on various topics in Physics and Astronomy. The videos are generally about fifteen minutes long. Episodes are at https://www.youtube.com/channel/UC7_gcs09iThXybpVgjHZ_7g.

Astronomy Picture of the Day

APOD is a premier website for images of our Universe. Starting in 1995, the website, as its name indicates, has displayed a single image or video each day along with an explanation. Those explanations have been written by two professional astronomers – Robert Nemiroff and Jerry Bonnell, described on the website as "two married, mild and lazy guys who might appear relatively normal to an unsuspecting guest." For the current day's picture, you can go to the website itself, https://apod.nasa.gov/apod/astropix.html, or you can peruse an extensive archive at https://apod.nasa.gov/apod/archivepix.html to see many of the wonders of a Universe over 13 billion years in the making.

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Thank you!

Recent Astronomy Highlights – continued from page 2

Mercury's Ice

Starting in 2011, the MESSENGER spacecraft (MErcury Surface, Space Environment, GEochemistry and Ranging) detected evidence of water ice in craters at the poles of Mercury, craters that are permanently in shadow. This was much like the discoveries of ice in polar craters on the Moon, but the amounts of ice on Mercury mysteriously seemed to be much larger than those on the Moon. Now scientists are theorizing that ironically the high temperature of the planet, as well as the greater intensity of solar winds, played a part in the formation of the larger reservoirs of ice in Mercury's craters. More information can be found at https://www.sciencedaily.com/releases/2020/03/200313155329.htm

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Occultation Notes

- D following the time denotes a disappearance, while R indicates that the event is a reappearance.
- When a power (x; actually, zoom factor) is given in the notes, the event can probably be recorded directly with a camcorder of that power with no telescope needed.
- 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.
- 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".
- 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

Asteroidal Occultations

2020	Day	EDT	Star	Mag.	Asteroid	dmag	dur. s	Ap. "	Location
Apr 11	Sat	21:51	SAO 118054	8.7	*PANSTARRS	13.3	0.5	3	e. USA
Apr 12	Sun	22:28	SAO 94025	8.2	Kathleen	8.3	1.6	3	nw-seTN,swNC,nSC
Apr 13	Mon	22:56	TYC13080185	9.8	Jacqueline	7.7	1.2	4	w&swNY,neNE,nNJ
Apr 14	Tue	22:30	4UC35366940	12.3	Leda	0.8	9	7	se&wNY,nNJ,nePA
Apr 20	Mon	22:14	TYC07392589	10.5	Walpurga	5.4	2	4	nOH,nPA,nNJ,LI
Apr 21	Tue	20:21	4UC55343906	12.3	Astraea	0.3	6	8	c&ecVA,seMD
Apr 23	Thu	4:40	4U416135027	12.4	Leopoldina	2.7	6	7	WV,wMD,ePA,nNJ
Apr 26	Sun	21:42	ZC 1417	8.6	Amanda	2.5	2	3	nOH,c&swVA,neNC
Apr 26	Sun	22:20	4UC58726683	12.5	Bredichina	2.6	4	8	cOH,c&swVA,neNC
Apr 29	Wed	2:28	4UC37670662	13.4	Memoria	1.6	3	10	MD,DC,nVA;swPA?
May 1	Fri	1:08	TYC73091314	11.5	1999 RB101	4.9	4	8	SC,wNC;VA,WV?
May 4	Mon	2:59	4UC37383175	12.9	Delila	3.1	4	9	sMD,nVA,sOH;DC?
May 4	Mon	23:06	4UC50743804	14.2	Svea	1.0	3	12	nKY,sWV,cVA;sMD?
May 10	Sun	0:54	SAO 82820	9.5	Denise	5.2	11	4	sMD,DC,nVA,sOH

*The Apr. 11th C/2014 R3 PANSTARRS comet event is very uncertain; info. at http://ocultacions.astrosabadell.org/COMETOC/20200412__49100_summary.html

Lunar Grazing Occultations

2020	Day	EDT	Star	Mag	% alt	CA	Location, Notes
Apr 11	Sat	2:10	ZC 2338	6.4	86- 26	16S	neColumbia,sHanover,Arnold,MD
Apr 16	Thu	6:04	SAO 190070	8.4	35- 21	0S	Strlng,VA;DC;Bethsda&Bowie,MD
Apr 25	Sat	21:58	epsilonTau	3.5	8+ 5	1S	Alden,PA;Warren,NJ;StatnIs,NY
Apr 27	Mon	23:40	11 Gem	6.9	22+ 8	3N	Leesbg,McLnVA;sDC;MrloHgts,MD
Apr 30	Thu	21:19	SAO 80631	7.6	52+ 61	6N	nCulpepr,sBelvue,sTapahonk,VA

Links for interactive maps are at http://iota.jhuapl.edu/exped.htm

Lunar Total Occultations

2020	Day	EDT	Ph	Star	Mag	%	alt	CA	Sp.	Notes
Apr 10	Fri	23:50	R	SAO 159763	6.5	86-	7	68S		Az. 122, nuScoD 2" from C
Apr 10	Fri	23:50	R	nu Sco A-B	4.1	86-	7	66S	B2	ZC2322=Jabbah B 1"fromA
nuSco mags. Aa 4.5,Ab 6.8,B 5.3,C 6.6,D 7.2;Sep. Aa-Ab = 0.1"; A= C+16s										
Apr 11	Sat	3:50	R	ZC 2343*	6.3	85-	31	64S	K0	
Apr 11	Sat	4:21	R	SAO159860*	7.4	85-	31	64N	B9	mg2 8.1,sep. 47"(-103s)
Apr 11	Sat	4:38	R	SAO159864*	7.6	85-	31	69N	B9	mg2 8.5,sep. .2"(+0.3s)
Apr 12	Sun	6:18	R	ZC 2504*	7.4	76-	26	47N	B9	Sun alt. -4 deg.
Apr 12	Sun	6:18	R	ZC 2504*	7.4	76-	26	47N	B9	Sun alt. -4 deg.
Apr 14	Tue	3:00	R	ZC 2811	6.3	56-	7	6N	F8	Az129,mg2 10,R21s early
Apr 16	Thu	6:04	G	SAO 190070	8.4	35-	20	6S	K1	Sun alt. -5, DC graze
Apr 17	Fri	4:56	R	ZC 3214	6.8	27-	6	54S	A0	Azimuth 119 degrees
Apr 26	Sun	20:26	D	ZC 791	7.3	14+	32	67S	B8	Sun altitude -7 degrees
Apr 26	Sun	21:01	D	109 Tauri	5.0	14+	26	39N	G8	The star is ZC 792
Apr 27	Mon	21:50	D	SAO 78158	8.3	22+	27	69S	G5	
Apr 27	Mon	23:16	D	12 Gem	7.0	22+	12	78N	A0	Az 291,ZC964,mg2 11 62"
Apr 27	Mon	23:21	D	SAO 78211	7.9	22+	10	30S	B0	Azimuth 291 degrees
Apr 27	Mon	23:44	D	X08814	7.6	22+	7	38N	B9	Az. 295, close double?
Apr 28	Tue	23:05	D	ZC 1100	8.2	31+	23	37S	K	
Apr 30	Thu	0:58	D	SAO 80064	8.4	42+	12	56N	F8	Azimuth 288 degrees
May 1	Fri	2:04	D	ZC 1377*	7.0	54+	8	73S	A3	Azimuth 287 degrees
May 1	Fri	22:20	D	ZC 1479	6.4	64+	57	78S	F2	
May 3	Sun	1:33	D	ZC 1612	7.3	75+	29	80N	F5	
May 3	Sun	22:08	D	ZC 1725	7.6	84+	56	86S	K0	Close double
May 5	Tue	21:49	D	ZC 1976	7.0	97+	35	75N	A3	
May 5	Tue	22:22	D	88 Vir	6.6	97+	39	73N	K0	ZC1978; close double?
May 6	Wed	2:50	D	ZC 1994*	6.6	98+	29	76S	F8	mag2 7.2, D -6 sec.
May 9	Sat	2:32	R	ZC 2415	7.3	95-	29	77N	M2	Axis angle 283 deg.
May 10	Sun	1:58	R	ZC 2562	7.0	89-	22	63S	K1	Close double??
May 11	Mon	4:13	R	SAO187431	7.3	81-	26	61N	B3	
May 11	Mon	5:08	R	SAO187465*	7.4	81-	26	55S	G0	Sun alt. -9 deg.
May 11	Mon	5:11	R	ZC 2756	7.5	81-	26	9N	K0	Sun -9, Term. Dist. 17"
May 12	Tue	5:10	R	ZC 2907	6.2	72-	27	58N	K3	Sun -9, mag2 11, R +15s
May 12	Tue	5:45	R	SAO 188713	7.9	71-	27	57N	K2	Sun altitude -3 degrees

*in Kepler2 program so occultation light curves are sought.

More, esp. total lunar occultations, at http://iota.jhuapl.edu/exped.htm
David Dunham, dunham@starpower.net

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Maps and additional information for April-May Occultations

David Dunham

For all events, see http://iota.jhuapl.edu/exped.htm, the Mid-Atlantic Occultations Web page.

*(**Editor's Note:** With the Stay-at-Home orders for the DC region likely still being in effect on the dates of the occultations highlighted below, the NCA is not encouraging travel to them. However, some of you may live in the paths of the occultations. If so, hopefully you can help in recording results for them. And, if possible, consider letting us know how it went. Thanks.)*

Asteroidal Occultations

Of special note is the last event on the list, the May 9/10 occultation of 9.5-mag. SAO 82820 by (667) Denise, an 88-km asteroid whose path is predicted to pass over DC, northern VA, and central and southern MD. When occulted, the star will be high in the sky, in Coma Berenices, at J2000 RA 13h 23m 52.0s, Dec +20 deg. 08' 12". Finder charts of different scales to locate the target star, a USA path map, and other event details are at http://www.asteroidoccultation.com/2020_05/0510_667_64916.htm .

With the event occurring in the middle of the weekend (late Saturday night, actually 12:54 am EDT Sunday morning), hopefully many observers can point even small telescopes to the star, to see if an occultation occurs where they live, and perhaps time it with a cell phone app. For information about timing occultations, see the observing section of IOTA's Web site at http://occultations.org/ .

Lunar Grazing Occultations

Predicted lunar profiles, interactive Google maps, and recommended offset values to use with them are given in the grazing occultation section of http://iota.jhuapl.edu/exped.htm .

April 16: The bright morning twilight, Sun alt. -5 deg., will make this a little difficult, but the event should be observable with long-focal-length telescopes and high power. The star will be easy to see before the graze, while the sky is darker; you can see it on the bright side of the Moon, approaching the southern cusp. The best range for observing the graze, where the LRO-based lunar profile shows there will be about 7 occultations of the star by lunar mountains, is only 150 meters wide, shown between the two dark gray lines on three maps over the DC area:

Northern Virginia

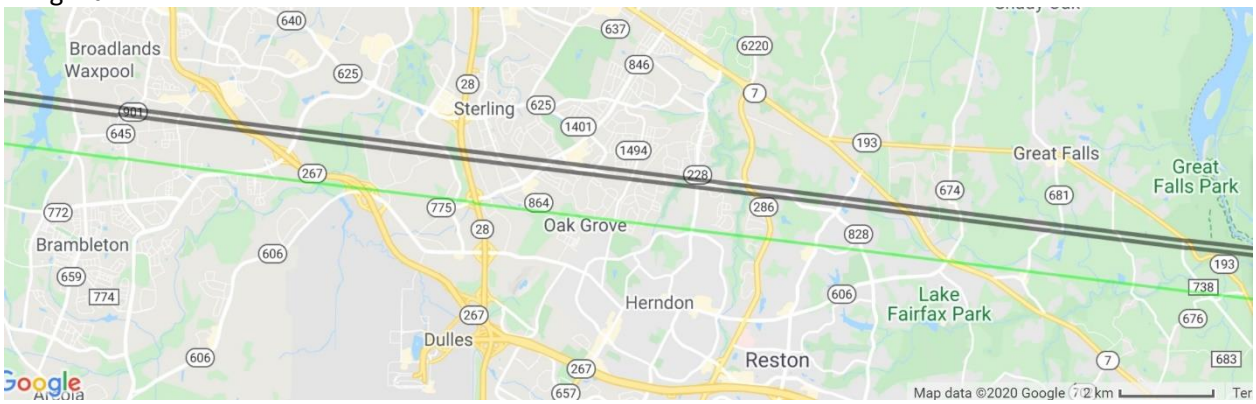

Image Credit: David Dunham and Google Maps

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Occultations – continued from page 6

DC and near Maryland suburbs

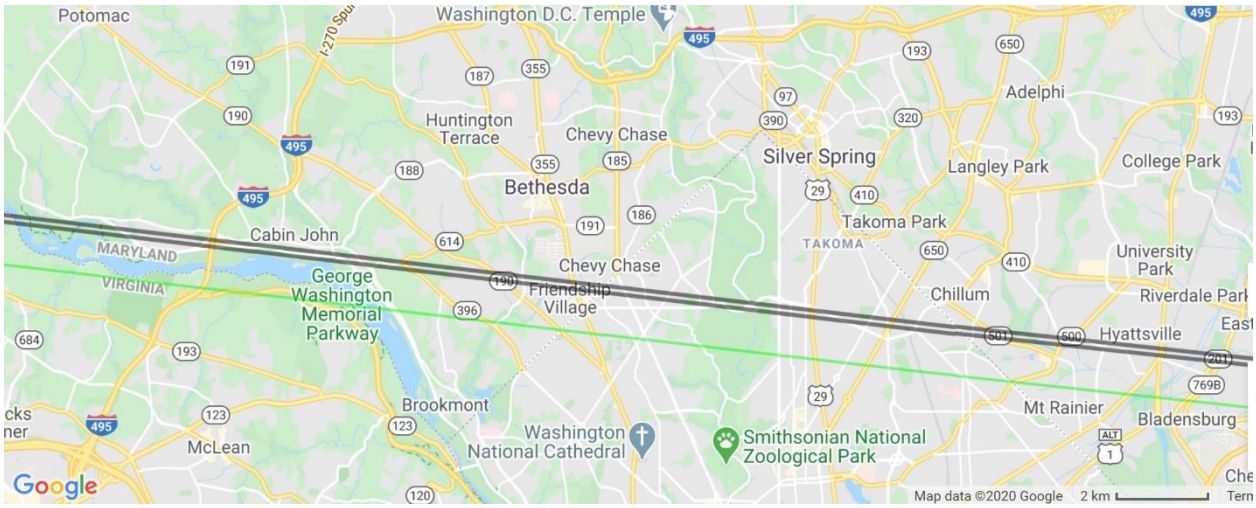

Image Credit: David Dunham and Google Maps

Eastern Maryland suburbs

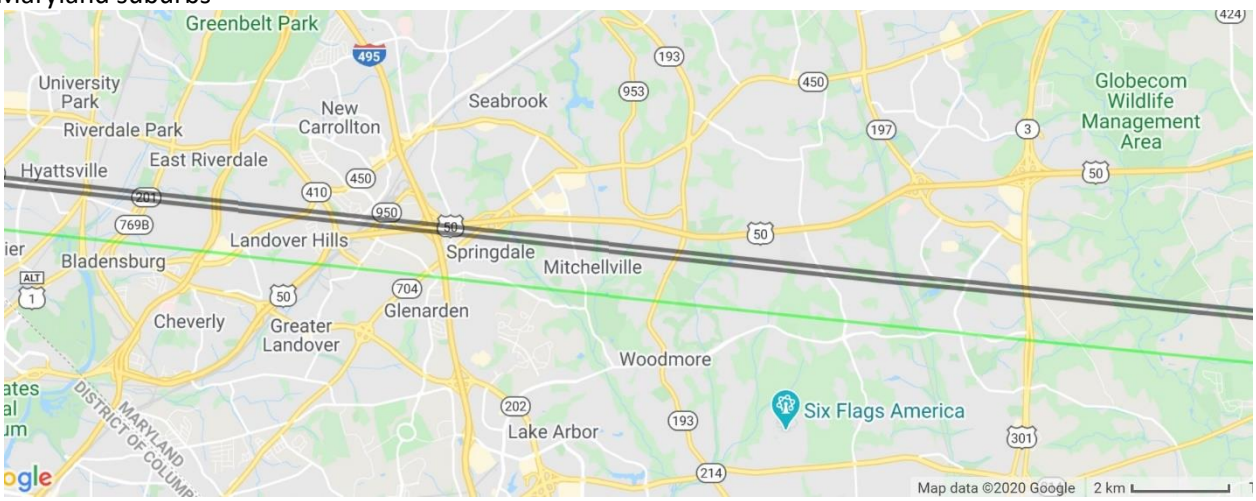

Image Credit: David Dunham and Google Maps

Two or more occultations will be visible from a very wide (6 miles) range shown between the dark gray lines in this wide-area map:

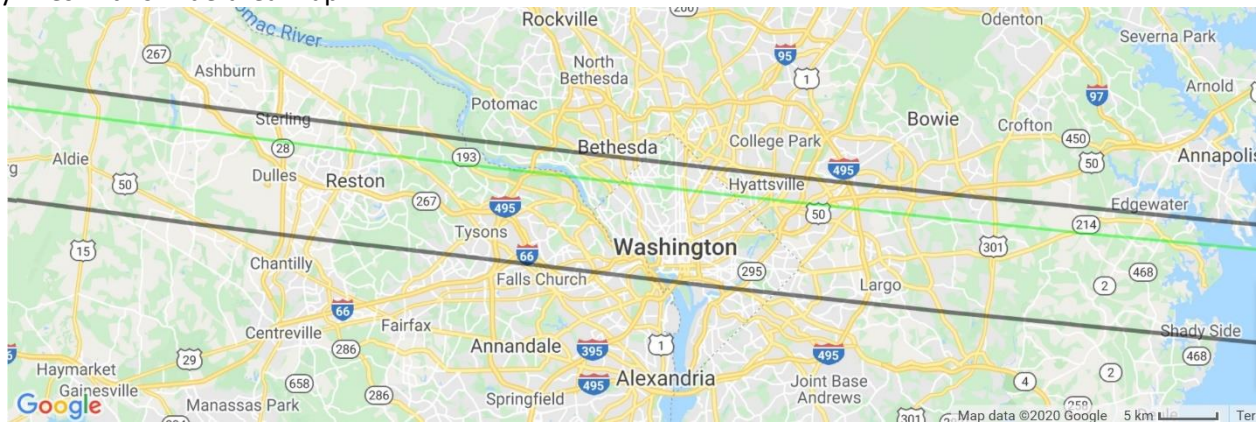

Image Credit: David Dunham and Google Maps

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Occultations – continued from page 7

April 27: The star is ZC 962. This is one of the best grazing occultations to cross the DC region during 2020; you should try to observe it, if you live in the path, or are able to travel into it. However, the sky will need to be quite clear and you will need a low, unobstructed western horizon, such as over a lake or wide field, or from a west-facing apartment in a high-rise, since the altitude will be only 8 deg. in azimuth 294 deg. (w.-n.w.). The graze has a great lunar profile with a best range, where up to 10 occultations of the star might be seen, in an 800-meter-wide path. The best part of the path is in the southern 200m of that, while it will be almost as good in the northern 200m of the range, but if possible, avoid the center of the range, where only 4 occultations might occur (still pretty good). This graze zone is shown between the two dark gray lines in three maps:

Northern Virginia, west

Image Credit: David Dunham and Google Maps

Northern Virginia, east

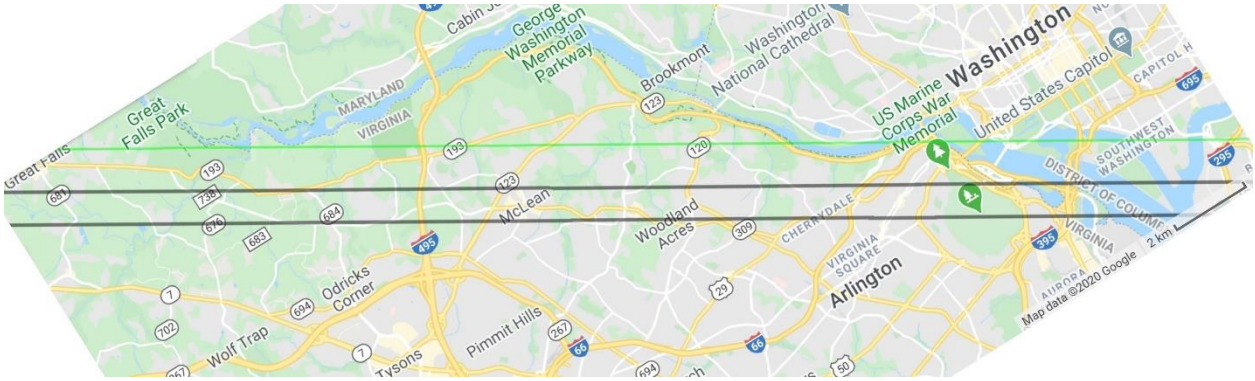

Image Credit: David Dunham and Google Maps

Southeast DC and Maryland

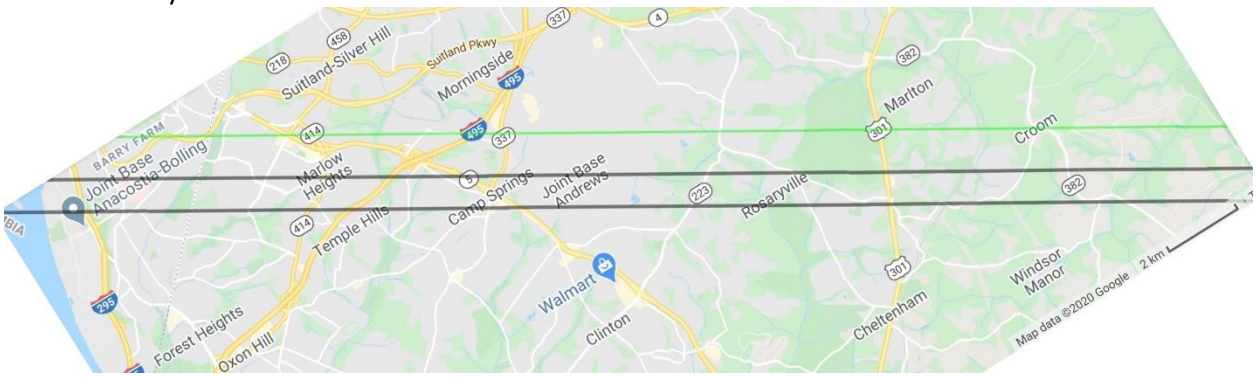

Image Credit: David Dunham and Google Maps

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Betelgeuse Update

Betelgeuse during the fading. Image credit: ESO/M. Montargès *et al*.

Hopes that Betelgeuse will go supernova seem to be fading at the same time that the star has begun to brighten again. But as the picture above shows, something strange is happening to the red supergiant star. One theory is that a convection cell brought material from within the star to the surface where it cooled, causing the fading. While convection cells on stars like the Sun tend to be smaller relative to the size of the star itself, on red supergiants like Betelgeuse such convection cells can cover a large portion of the star. Another theory is that the fading was caused by dust that formed around the star as material was sloughed off of it, a process common to red supergiants.

A recently released study seems to give credence to one of those theories. The authors, Emily Levesque and Phillip Massey, took a spectrum of Betelgeuse in February at the Lowell Observatory in Flagstaff, Arizona, specifically looking for the signature of titanium oxide, a chemical that can accumulate in the surface layers of red supergiants. That spectral signature was then used to determine the temperature of Betelguese for comparison with temperatures taken before the fading began. A significant drop in temperature would support the convection-cell theory, while little or no temperature decrease would point to the dust theory. The results – Levesque and Massey found the temperature of Betelguese to be around 3,300 degrees Celsius (6017 degrees F), only 100 or fewer degrees lower than previous readings. So, dust formation seems to be the likely cause of the fading of Betelgeuse. And it looks like supernova enthusiasts must continue to wait for some celestial fireworks.

A copy of the article published in Astrophysical Journal Letters can be found at https://arxiv.org/pdf/2002.10463.pdf.

Recent Astronomy Highlights – continued from page 4

Comet 2I/Borisov May Be Breaking Apart

In recent weeks, astronomers have recorded several episodes of brightening of Comet 2I/Borisov. These episodes have increased the brightness of the object by 0.7 magnitudes in a period of only five days. First detected in August 2019, Comet 2I/Borisov is only the second object ever discovered to have come from outside of our Solar System (the first such object being 1I/'Oumaumau). The possible fracturing, called nucleus fragmentation, may be the result of the comet's close approach to the Sun, approximately 190 million miles, in December of 2019. Astronomers will continue to monitor the comet for any signs of further brightening and fragmentation. A brief report on the brightening and its implications can be found at http://www.astronomerstelegram.org/?read=13549

Calendar of Events

NCA Mirror- or Telescope-making Classes: The Chevy Chase Community Center is currently closed due to the coronavirus pandemic. When it reopens, classes will be Tuesdays AND Fridays, from 6:30 to 9:30 pm at the Chevy Chase Community Center (intersection of McKinley Street and Connecticut Avenue, N.W.) Contact instructor Guy Brandenburg at 202-635-1860 or at gfbrandenburg@yahoo.com. Additional information is at guysmathastro.wordpress.com/ and home.earthlink.net/~gfbranden/GFB_Home_Page.html

Open house talks and observing at the University of Maryland Observatory in College Park are suspended until further notice. 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.). Details can be found at www.astro.umd.edu/openhouse

Next NCA Meeting tentatively scheduled at the University of Maryland Observatory: **9 May** 7:30 p.m., Joe Helmboldt, (NRL), *Radio Astronomy Observes the Earth's Ionosphere*

The APS Mid-Atlantic Senior Physicists Group: Due to the ongoing coronavirus pandemic, access to the American Center for Physics, the facilities that hosts APS lectures, has been restricted to employees only. Therefore, lectures are postponed at this time.

National Capital Astronomers Membership Form

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

Address: _____ **ZIP Code:** _____

Home Phone: ____-____-_____ **E-mail:** _____ **Print / E-mail Star Dust (circle one)**

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:
Henry Bofinger, NCA Treasurer; 727 Massachusetts Ave. NE, Washington, DC 20002-6007

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Please Note: *The April 11, 2020 NCA meeting has been cancelled.*

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