

THE MASON-DIXON ASTRONOMER

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From the editor

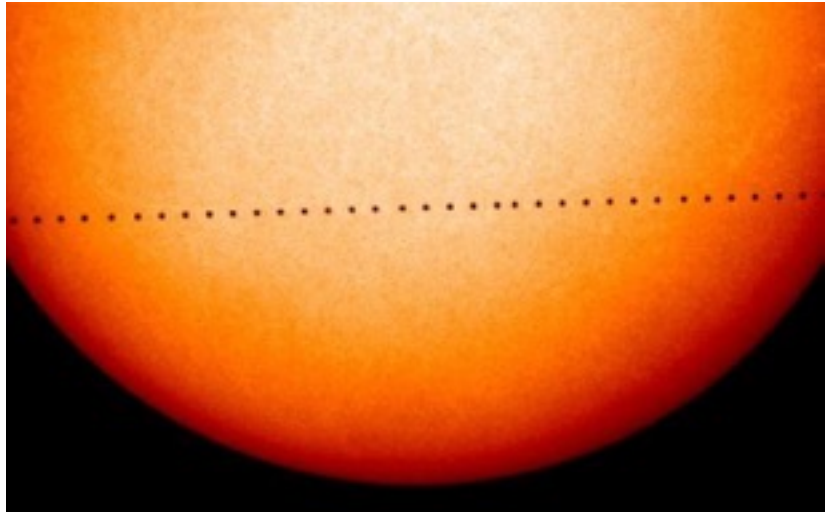
They say April showers bring May flowers, and that is especially true for us at WASI in 2016. For as we slog through the last chilly rainy days of April, we are presented with a May that kicks off in grand style with a rare transit of Mercury, visible from our front yards!

Our May meeting is shaping up to be no less fascinating, as Dr. Demos Kazanas returns to tell us more about the recent detection of gravitational waves from the merger of two black holes, each with a mass more than 30 times our Sun's.

Suffice to say, there's much to enjoy this May :)

Ad astra,

Christian Ready
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Composite image of observations by Solar and Heliospheric Observatory (SOHO) shows the path of Mercury during its November 2006 transit Credit:SOHO/NASA/ESA

A Rare Transit of Mercury

by Curtis Roelle, Chairman

On a Friday night in high school, a friend stayed over for the night so we could get up early the next morning and head out to find a hill on the east side of town to see the sunrise. Mercury was going to be visible during the day as it passed across—or *transited*—directly in front of the disk of the Sun. The problem was, from our location in the central plains, it was scheduled to end several minutes after sunrise. We overslept a little, and by the time we got the telescope set up and filtered on that cold November morning, the Sun was shining just above the horizon and it was all over.

The next couple of transits of Mercury occurred while it was nighttime on our side of the planet, so they were impossible to view. From that first failed attempt at sunrise it would take another 26 years before I successfully observed a transit of Mercury. Those circumstances, in November of 1999, were reversed from that first attempt because the transit began shortly before sunset rather than ending just after sunrise. Through a properly filtered telescope, I watched the tiny black dot of



May Meeting

Wednesday, May 11, 7:30pm
Bear Branch Nature Center

Guest: Dr. Demos Kazanas
Sciences and Exploration
Directorate, NASA Goddard
Spaceflight Center

Merging Black Holes and the Hunt for Gravitational Radiation

The recent observation of the signal from the merger of two black holes has been a breakthrough in gravitational astronomy. The detection showed that gravitational radiation behaves the way we thought it would and in the way that our observatories would detect. It fulfilled the promise to extract both the masses of the merging black holes and their distance without the direct observation of their redshift. However, not everything was as expected: The black holes' size (~30 solar masses each) in a tight binary is hard to comprehend within our notions of stellar evolution, so there are now more things to ponder. Still, the future of gravitational wave astronomy looks quite bright!

Mercury creep in front of the Sun as they sank below the clear horizon.

The next couple transits of Mercury would have been visible from here, but the weather must have been a factor. The observing log complains of morning fog obscuring one and makes no mention of the other. Fortunately, the upcoming transit occurs on Monday, May 9 and, weather permitting, the entire event from start to finish is visible from Maryland. There will be a number of sites around Carroll County for you to get a safe view of the phenomenon, thanks to the members of the Westminster Astronomical Society (WASI). Read on to find information about times and locations.

Mercury and Venus, both closer to the Sun than Earth, are the only planets we ever see transiting the Sun. Transits of Venus are rarer than transits of Mercury. The last transit of Venus was in 2012 and the next one is in 2117. Although transits of Mercury are less rare, they are still rarer than total solar eclipses. Transits of Mercury only occur in the months of May and November.

The May 9 transit starts at 7:12 a.m. as Mercury's tiny black disk begins to pass in front of the Sun. It will take about three minutes for the entire diameter of the planet to enter the Sun. Mid transit occurs at 10:57 a.m. EDT Mercury reaches the edge of the Sun at 02:39 p.m. and three minutes later it is all over at 02:42 p.m.

Observing the Sun without proper filtration is very risky. If you're not equipped to observe it yourself, here are some locations spread conveniently throughout the county where WASI volunteers are planning to set up equipment for public observing. Because the transit starts early in the morning, any of these places would be a good rest stop during rush hour.

The primary location for viewing the event is at the Blaine F. Roelke Memorial Observatory at Bear Branch Nature Center north of Westminster. The observatory has two telescopes and one of them is exclusively for solar observing.

Another Carroll County nature center is Charlotte's Quest in Manchester where viewing will be conducted at Pine Observatory.

The county libraries are coordinating with WASI to have telescopes at the various branches. The last update I received, the Westminster, Finksburg, Mt. Airy, Eldersburg and Taneytown branches were requesting WASI staff with telescopes to set up. The Hampstead branch had not yet indicated its plans. My advice is, if you are planning to view the transit from a Carroll County library branch, then you should give them a call the day before and confirm that they are participating and will have knowledgeable telescope operators on hand.

Transit Public Viewing Locations

Location: Bear Branch Nature Center / BFRMO

Contact: Steve Conrad & Eric Fultz 410-386-3580

Time: TBA

Location: Soldiers' Delight

Contact: Skip Bird
(PTTTbird@Quixnet.net)

Time: 7:00 AM–3:00 PM

Location: Charlottes Quest Nature Center, Manchester MD

Contact: Robert Clark
(rlclark21157@gmail.com)

Time: 7:00 AM–3:00 PM

Location: Westminster Library

Contact: Bob Auberger
(cogle@carr.org)

Time: 9:00 AM–1:30 PM

Location: Finksburg Library

Contact: Jon Mese
(howings@carr.org)

Time: 9:00 AM–3:00 PM

Location: Mt Airy Library

Contact: Tony Falletta
(nightsky_guy62@yahoo.com)

Time: 10:00 AM–2:00 PM

Location: Taneytown Library

Contact: Erich Bender
(MFoley@carr.org)

Time: 7:00 AM–3:00 PM

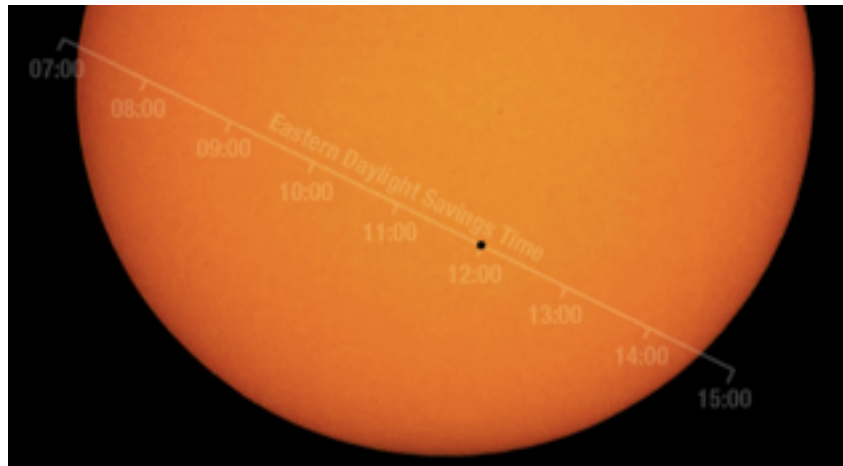
Location: North Carroll Library

Contact: Darrell Robertson
(drobertson@carr.org)

Time: TBA

Finally, Baltimore County's Soldiers Delight Nature Center will also have WASI members present with telescopes for viewing throughout the duration of the transit.

In summary three nature centers—two in Carroll and one in Baltimore County—and up to six Carroll County library branches will have safely filtered telescopes for solar viewing provided by WASI for public observing of the 2016 transit of Mercury.



Animation still of simulated path of Mercury during the 9 May 2016 transit. Times are given in Eastern Daylight Saving Time. Credit: NASA.

Full video: <https://youtu.be/IEkkCaBTgZ8>

Key Transit Times

calculations by Curtis Roelle, Chairman

Time	Event	Note
07:12 AM	1st contact	Sun is 12.5 degrees above the eastern horizon (azimuth 77.4)
07:15 AM	2nd contact	Mercury's full disk in front of Sun
10:57 AM	Mid-transit	Sun is 54.8 degrees above the southeast horizon (azimuth 119.3)
01:04 PM	Astronomical noon	Sun is due south and 68.1 degrees above the horizon (maximum alt.)
02:38 PM	3rd contact	Sun is 60.0 degrees above the southwest horizon (azimuth 130.1)
02:42 PM	4th contact	Transit ends

DO NOT, UNDER ANY CIRCUMSTANCES, ATTEMPT TO VIEW THE SUN WITHOUT A PROPER SOLAR FILTER.

Upcoming Events

WASI Planetarium Show & Star Party

Date: Saturday, 5/14/2016 at 7:30 PM

Location: Bear Branch Nature Center, 300 John Owings Rd., Westminster, MD 21158

Soldiers Delight Stargazing

Date: Saturday, 5/14/2016, 8:00 PM–11:00 PM

Location: Soldiers Delight Environmental Area, 5100 Deer Park, Owings Mills, MD 21117

Fort Frederick State Park Astronomy Program

Date: Saturday, 5/28/2016, 7:30 PM - 10:30 PM

Location: Ft. Frederick State Park, Big Pool, MD