The Night Sky

Total Lunar Eclipse of a "Supermoon"

The moon will experience a total lunar eclipse on the night of January 20-21, 2019. A lunar eclipse is caused by the moon passing into the earth's shadow cast by the sun. A partial lunar eclipse begins around 10:34 p.m. EST on the night of January 20th and totality begins around 11:41 p.m. Totality ends around 12:12 a.m. on January 21st and the last glimpses of the partial eclipse occurs around 1:51 a.m. During totality, the moon often appears reddish because the sun's light is refracted and scattered by atmospheric gases around the limb of the earth, some of this light gets redirected into the darkest part of the earth's shadow. Red light predominates in this light for the same reason that sunrises and sunsets also appear red. Since this lunar eclipse occurs in mid-winter with totality occurring around midnight, the moon will be very high in the night sky during this eclipse. Finally, since this month's full moon (when the eclipse is at mid-totality) occurs within a day of the moon's orbital perigee (the closest point in the moon's orbit around the earth), this eclipse will be a **supermoon eclipse**!

The only bright planet that remains in the evening sky is the red-planet Mars. Mars continues its rapid movement in the night sky in the constellation of Pisces. The red planet shines about halfway up in the southwestern sky a few hours after sunset. However as the earth continues to race away from Mars as they both orbit the sun, its brightness will fade a bit in January. However it still will be the brightest object in that part of the sky. Mars sets around 11:30 p.m. EST at the beginning of the month, and only about 20 minutes earlier on January 31st due to its rapid movement along the background stars.

We now have to wait until the pre-dawn hours before we can catch a glimpse of the other bright planets. Venus continues to shine brightly in the early morning sky. Venus rises a little after 3:30 a.m. at the beginning of the year. As the month progresses, Venus fades a bit, but it still be the brightest object in the early morning sky throughout the month. Venus has two close encounters with other celestial objects this month. In the early morning of January 22nd, Venus and Jupiter have a close encounter appearing only two-and-a-half degrees of arc apart on this date – let's hope for a clear sky on that morning. A planetary conjunction between our two brightest planets is a real treat! Four days following this close approach, Venus, Jupiter, and the red supergiant star Antares form a straight line. If we have a few days of clear skies around this time period, it is easy to spot the rapid movement of Venus against the background stars. At the beginning of the month, Venus is much higher and to the right of Jupiter 45 minutes before sunrise. Then by month's end, Venus has sunk below Jupiter appearing to the lower left of Jupiter. On the last day of the month, the waning crescent moon will be very close to Venus shining just to the right of Venus.

The king of the planets, Jupiter, rises around 5 a.m. on January 1st. Our second brightest planet will slowly increase in brightness throughout the month. By January 31st, Jupiter rises before Venus around 3 a.m. EST. A thin waning crescent moon will appear just to the left of Jupiter on the morning of January 3rd one-half hour before sunrise.

At the beginning of January, sharp-eyed observer might be able to spot Mercury hovering above the southeast horizon 30 minutes before sunset. One will need an unobstructed horizon to catch this planet

in the bright morning twilight. On the morning of January 4th, observers might also be able to spot a very slender crescent moon just above Mercury.

After passing behind the sun on January 2nd, Saturn returns to the early morning sky by the end of the month hanging low above the southeastern horizon 45 minutes before sunrise. It may be difficult to spot Saturn in the bright morning twilight.

The earth is at perihelion, the closest to the sun in space, at 12:20 a.m. EST on January 3rd. At this time, we will be 91,403,550 miles from our star, which is 3.1 million miles closer than when it is at its farthest distance on July 4th (at 5:11 p.m. EDT) 2019.

The next free public astronomy open house at the ETSU Powell Observatory will occur on Saturday, February 9th, 2019. At these open houses, the public can view objects in the sky through telescopes and hear talks by faculty of the Physics and Astronomy Department. Note that the open houses are cancelled if the sky is cloudy. Make sure you dress warmly since you will be standing outside to look through our telescopes. Further information about these open houses and directions to the observatory can be found on the web at https://www.etsu.edu/cas/physics/observatory/default.php.

For those of you who would rather explore the night sky indoors, a planetarium show will be given on January 17th at 7:00 p.m. at the ETSU Planetarium in Hutcheson Hall. A location map of the Planetarium on the ETSU campus can be found on the web at https://www.etsu.edu/cas/physics/outreach/planetarium.php.

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