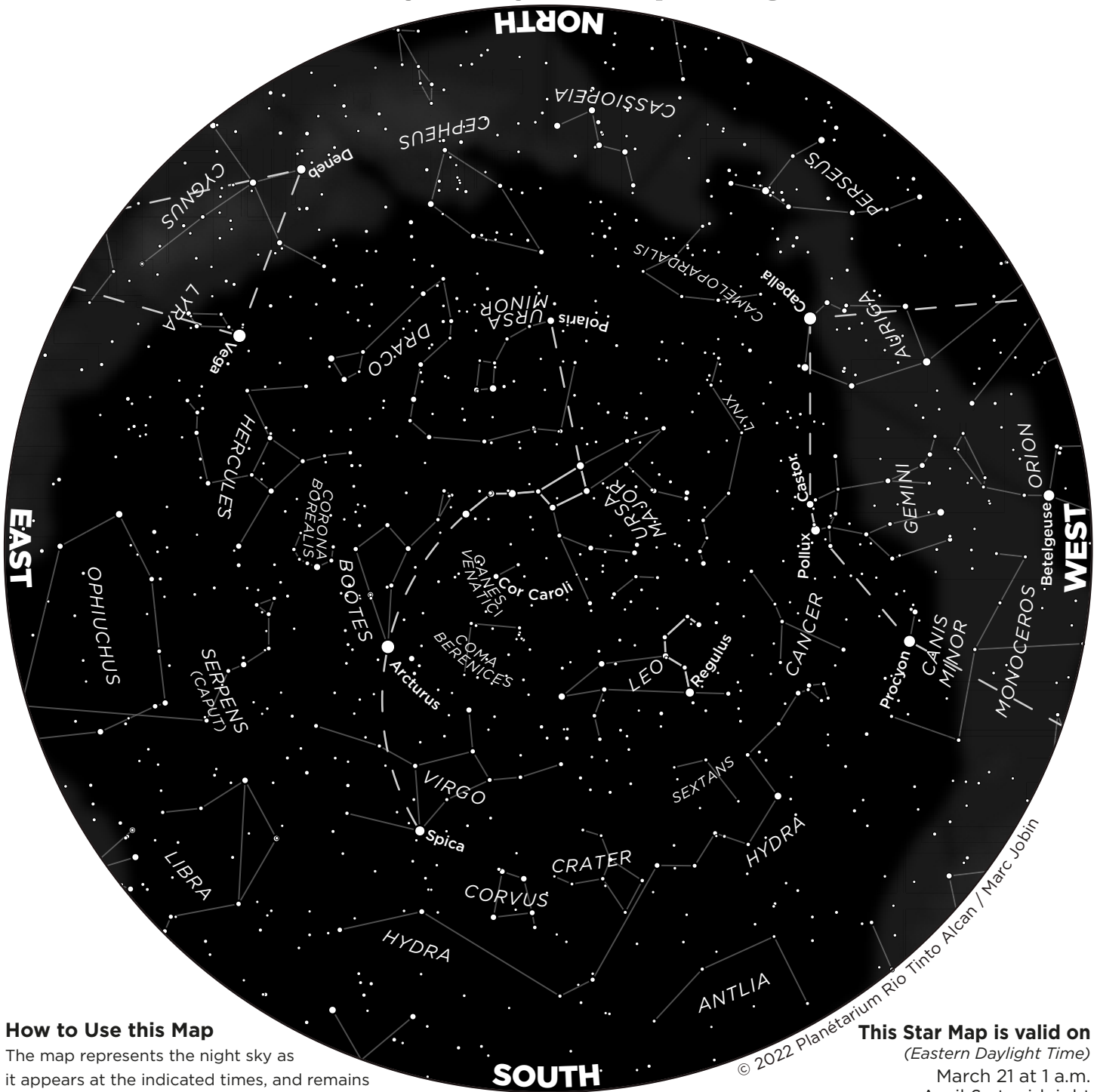


The Starry Sky – Spring 2022



How to Use this Map

The map represents the night sky as it appears at the indicated times, and remains usable several hours before and after.

Hold the map up to the sky in front of you and turn it so the direction you are facing appears at the bottom. Lines identify the constellations. The shaded area outlines the Milky Way.

This Star Map is valid on

(Eastern Daylight Time)

March 21 at 1 a.m.

April 6 at midnight

April 21 at 11 p.m.

May 6 at 10 p.m.

May 21 at 9 p.m.

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The Sky This Spring

Most of the bright planets have moved out of the evening sky this spring.

Venus, Mars, Saturn and Jupiter won't be visible until the end of the night and at dawn.

Only Mercury puts in a brief appearance after sunset.

Mercury appears in the evening

As the closest planet orbiting the Sun, **Mercury** often goes unnoticed. The reasons for this are many and varied, including being too dim, too low on the horizon, or simply washed out by our star's brilliance at dawn or dusk. There are few good opportunities throughout the year to see Mercury, so be sure to seize them every chance you get. Evenings in the spring are an especially favourable time for spotting the tiny planet.

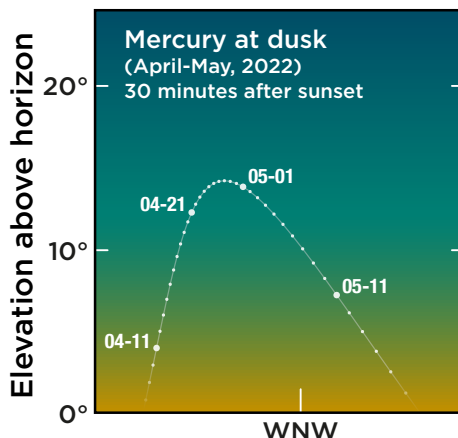
In fact, Mercury reaches its greatest elongation on April 29 (20.6 degrees east of the Sun) and has an excellent apparition at twilight **from April 13 to May 10**. The tiny planet is much brighter at the start of this period, but it is too low on the horizon before April 12; it then becomes harder to see after May 3 and simply too dim after the 10th. Look for a small dot of light in the glow of twilight, 30 minutes after sunset, low on the west-northwestern horizon; Mercury will be visible for up to one hour after sunset. The planet will be very close to the Pleiades star cluster from April 27 to May 2; **on the evening of May 2**, the thin crescent Moon enters the scene.

Once you spot Mercury, you can check it off your bucket list of must-see celestial objects.

Venus, the morning star

Venus is the most eye-catching celestial body in the morning sky. The dazzling planet blazes like a beacon at dawn, one hour before sunrise; it can be found low on the southeastern horizon in early spring, in the east-southeast in mid-April, due east by mid-May, and in the east-northeast at the end of the season.

A small telescope is all you need to observe the planet's changing appearance from week to week. On March 21, you'll be treated to a "half-Venus," 24 arc seconds



in diameter. Then, as Venus slowly recedes from Earth and its illuminated part turns to face us, the planet's apparent size will actually appear to shrink while its disc transforms to gibbous and increasingly becomes a "full Venus."

But look closely and you'll see that Venus has company in this section of sky: During the first weeks of spring, the much-fainter Mars and Saturn can be found in close proximity (see the sections below). Venus eventually drifts away, but it approaches another brilliant planet that emerges at dawn in April: It's Jupiter, which will be in conjunction with Venus **on the mornings of April 30 and May 1**, a mere 1/2 a degree apart.

The waning Moon has a few lovely encounters with Venus and its neighbours at dawn. It hangs 5 degrees below the Venus-Saturn-Mars trio **on the morning of March 28**, very low in the southeast, 30 minutes before sunrise. **On the morning of April 27**, the waning Moon lies 4 degrees below the Jupiter-Venus duo, very low in the east, 30 minutes before sunrise. **On May 27 at dawn**, the very thin lunar crescent lies only 2 1/2 degrees to the lower left

of Venus, very low in the east, 45 minutes before sunrise.

Saturn at night's end

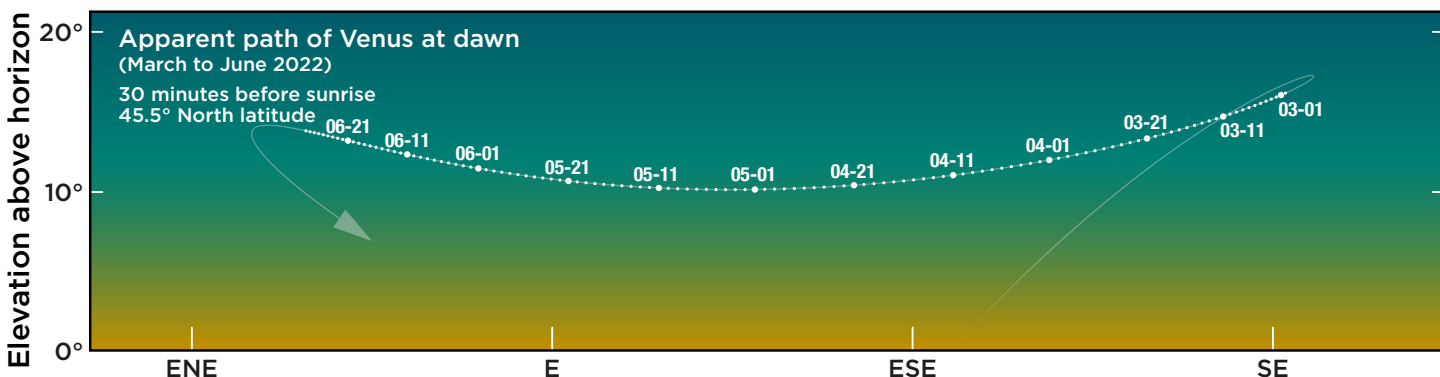
Among the bright planets, **Saturn**—with its orbital period of about 30 years—is the one that travels slowest around the Sun, and its siblings often catch up to and overtake it. In early spring, low in the southeast at dawn, Saturn forms a trio with Mars, to its right, and the unmistakable Venus, right above it; the waning Moon joins them **on the morning of March 28**, 30 minutes before the Sun comes up. Venus moves eastward (left) over the following days, whereas Mars draws closer to Saturn: **on the morning of April 5**, Saturn and Mars are in conjunction, separated by about 23 arc minutes. But this encounter is short-lived, since Mars continues its eastward dash through the constellations the very next day.

Saturn spends the whole year in the eastern part of the constellation Capricornus, next door to Aquarius. The ringed planet rises just before dawn in early spring, then increasingly earlier as the weeks go by; however, you'll have to wait until mid-June to see Saturn before midnight.

The waning Moon will again pass a few degrees below Saturn **on the mornings of April 24 and 25**. **On the morning of May 22**, the last quarter Moon comes to within 5 degrees below the planet, low in the southeast one hour before sunrise. Finally, **on the night of June 17 to 18**, the waning gibbous Moon swings 6 1/2 degrees to the lower right of Saturn; the pair rise shortly before midnight and can be found in the south-southeast at dawn.

Mars inches ever closer

Mars gradually pulls away from the Sun over the spring, but its rapid trek eastward among the background stars means the



planet is only visible at the very end of the night and at dawn, low in the southeast. Although the Red Planet remains far from Earth for several more months, it gains some brightness, shining at magnitude +1 around April 12. This tiny orange dot in the sky is clearly recognizable and can easily be tracked as it dashes through the constellations: Starting in Capricornus (where it crosses paths with Saturn on April 5), Mars enters Aquarius on April 11, crosses the border into Pisces on May 19 (where it is in conjunction with Jupiter on the 29th), then makes a brief foray into Cetus the Whale as of June 2 before reentering Pisces on the 9th.

After its encounter with Venus, Saturn and the Moon on March 28, followed by its conjunction with Saturn on April 5, Mars goes solo for a few weeks. **On April 26, at dawn**, the thin waning Moon glides 6 degrees below Mars, low in the east-southeast, 40 minutes before sunrise. Mars then cozies up to brilliant Jupiter, which is emerging at dawn. **On the morning of May 25**,

the thin waning Moon can be found 4½ degrees below the Jupiter-Mars duo, a mere 2½ degrees apart; admire this lovely triangle, low in the east-southeast, one hour before sunrise. The conjunction between Mars and Jupiter takes place **on the morning of May 29**; the two planets are separated by about 35 arc minutes, just barely more than the apparent diameter of the full Moon.

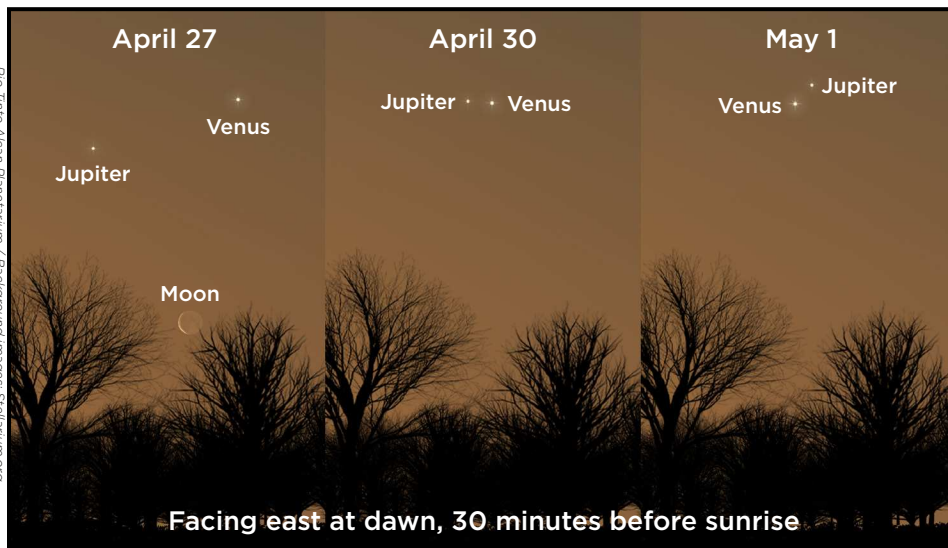
Jupiter reappears at dawn

The brilliant **Jupiter** slipped behind the Sun on March 5 and is slowly emerging from our star's glare. By mid-April, it becomes visible low on the eastern horizon, 30 minutes before sunrise. The gap between the giant planet and the Sun widens as the weeks go by, and although Jupiter rises increasingly earlier, you won't spot it before midnight until the summer months. It can initially be found in the constellation Aquarius, but it continues racing eastward, crossing into Pisces on April 14 before making an excursion into Cetus the Whale from June 25 to September 1.

Dazzling Venus forms a striking duo with Jupiter during the last mornings of April: **On the 27th**, the thin waning Moon comes to within just 4 degrees below the Venus-Jupiter pair, forming a pretty triangle visible very low in the east a mere 30 minutes before sunrise. Venus and Jupiter will be in conjunction in the dawn sky **on April 30 and May 1**, separated by about ½ a degree on both days, low in the east, 45 minutes before sunrise. Then it's Mars's turn to approach Jupiter: The two planets are just 2½ degrees apart **on the morning of May 25** when the lunar crescent glides 4½ degrees below them, forming a triangle that is visible low in the east-southeast, one hour before sunrise. Mars and Jupiter will be in conjunction a few days later, on May 29. Finally, **on the morning of June 21**, the last quarter Moon lies 5 degrees to the lower right of Jupiter, low in the east around 1 a.m. and higher in the southeast at dawn.

Clear skies!

Research and text: **Marc Jobin**



Rio Tinto Alcan Planetarium / Background images: Stellarium.org

SEASONAL MILESTONES

The **spring equinox** happens on March 20, 2022 at 11:33 a.m. EDT, and the **summer solstice** is set to occur on June 21 at 5:13 a.m. Spring 2022 will last exactly 92 days 17 hours 40 minutes.

PHASES OF THE MOON

(Eastern Daylight Time)

Full moon	Last quarter
March 18 at 3:17	March 25 at 1:37
April 16 at 14:55	April 23 at 7:56
May 16 at 0:14	May 22 at 14:43
June 14 at 7:52	June 20 at 23:11
New moon	First quarter
April 1 st at 2:24	April 9 at 2:48
April 30 at 16:28	May 8 at 20:21
May 30 at 7:30	June 7 at 10:48
June 28 at 22:52	July 6 at 22:14

METEOR SHOWERS

Will we be treated to an outburst of the Tau Herculids?

The second half of winter and spring are not blessed with spectacular meteor showers like the Perseids or Geminids. Already considered one of the least showy of the annual meteor showers, **the Lyrids** (peak around April 22) will also be hampered by the waning gibbous Moon this year. **The Eta Aquarids**, on the other hand, will have the advantage of a moonless sky in 2022, but they will only be visible between 3 a.m. and dawn; the shower peaks over several days, with the maximum expected on May 6.

It's probably a safe bet that you have never heard of the **Tau Herculids**. This

usually very weak meteor shower is associated with Comet 73P/Schwassmann-Wachmann 3 (SW3), which broke apart in 1995: The streams of particles emitted at the time should intersect the Earth's orbit **on May 31 at around 1:05 a.m. (+/- 10 min)**, according to different computer models. But the speed at which the dust and the Earth's atmosphere will meet is exceptionally slow: "only" 16 km/s (58,000 km/h), which is double that of the satellites in low Earth orbit, but still considerably slower than a typical Perseid meteor (60 km/s) or even a Geminid meteor (36 km/s). Therefore, we should realistically expect the Tau Herculids meteors to be faint. Another

major unknown is the shower's possible intensity, meaning the maximum number of meteors per hour. All in all, this burst should last only a few minutes.

The radiant of the Tau Herculids, despite its name, is in fact located in western Boötes, near Canes Venatici (RA 14h, Dec +28°). In southern Quebec, it will be about 50 degrees high at the time of closest approach. The Moon will be new and won't interfere with viewing. This means the overall conditions for observing this event are favourable. So, mark your calendars and keep your eyes peeled: There just may be some unexpected surprises!

The Moon Puts on a Show

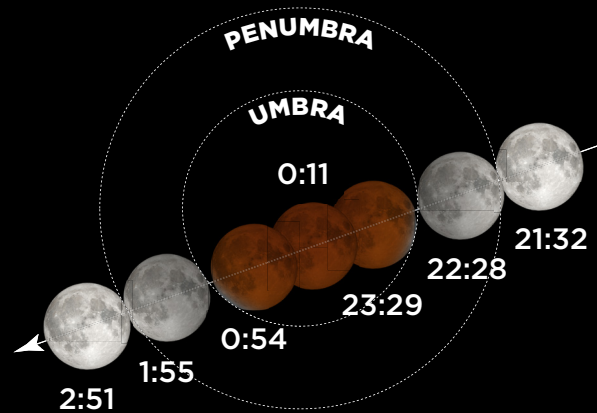
TOTAL LUNAR ECLIPSE

Finally! A total lunar eclipse, the first in more than three years to be visible from Quebec, will take place **during the night of May 15 to 16.**

This phenomenon will be fully visible from eastern North America.

The Moon gradually enters the Earth's penumbra at 9:32 p.m. (Eastern Daylight Time), but we'll only be able to detect a subtle darkening along the left part of its disc a few minutes before the beginning of the partial phases at 10:27 p.m. After that, we'll begin to see the circular profile of Earth's shadow gradually creep over the surface of our satellite. **The eclipse will be total from 11:29 p.m. to 12:54 a.m.:** The only light hitting the Moon will be the sunlight that is reddened and refracted (bent) by its passage through Earth's atmosphere. The surface of our celestial companion will turn an impressive orange hue, the brightness of which depends on the amount of aerosols in the stratosphere.

The eclipse reaches its maximum at 12:11 a.m. The Moon will then be 23 degrees high in the south-southeast, in the constellation Libra. After totality, the Moon gradually exits the Earth's umbral shadow: The partial phases play out in reverse and wrap up at 1:55 a.m. The less spectacular partial penumbral eclipse continues until 2:51 a.m., marking the end of the event.



The Moon will enter the Earth's umbral shadow during the night of May 15 to 16. The north is at the top; depending on the time of night and where on Earth you are, the entire figure needs to be rotated left or right to match the Moon's orientation in the sky. (Diagram: Marc Jobin/PRTA, with data from F.Espenak/NASA GSFC; Moon images: NASA SVS)

TWO FINE OCCULTATIONS

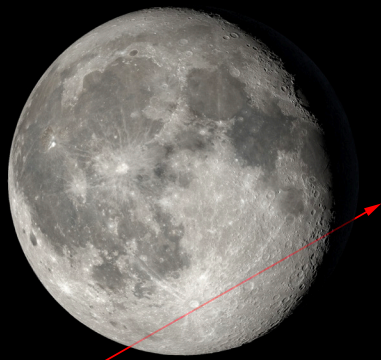
The Moon travels continuously against the backdrop of stars. It sometimes passes in front of a star, creating a sort of "mini-eclipse" that is called an occultation. Given their astronomical distance from us (pun intended!), stars appear as unresolved dots of light (with a few exceptions); they disappear and reappear

along the edge of the Moon in the blink of an eye. It is an absolutely fascinating phenomenon to watch and, in the case of relatively bright stars, easy to observe with small instruments. Here are two occultations observable from southern Quebec this spring that are definitely worth a look.

11:11:22 p.m. at our satellite's dark limb (22 degrees high in the south).

Please note: All times shown (Eastern Daylight Time) are approximate and may vary by several seconds depending on your exact geographic location. Look through the eyepiece at least one minute before to ensure you don't miss a thing!

Occultation of Dschubba (Delta Scorpii) Night of April 18 to 19, 2022

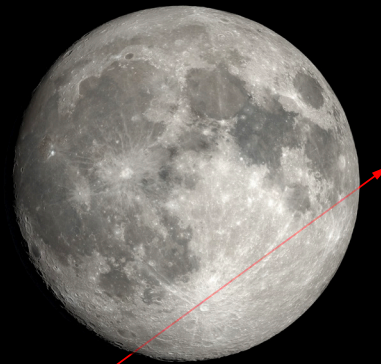


Apparent trajectory of the star behind the Moon, viewed from Montréal

During the night of April 18 to 19, the waning gibbous Moon (92% illuminated) occults **Dschubba** or Delta Scorpii (magnitude +2.3), one of the stars forming the head of Scorpius. As seen from Montreal, Dschubba disappears at 2:12:51 a.m. behind the Moon's illuminated edge (21 degrees high in the south-southeast) and reappears at 3:07:55 a.m. at our satellite's dark limb (22 degrees high in the south).

The waxing gibbous Moon (97% illuminated) again occults **Dschubba on the evening of June 12.** As seen from Montreal, the star disappears at 10:15:25 p.m. behind the Moon's illuminated edge (21 degrees high in the south-southeast) and reappears at

Occultation of Dschubba (Delta Scorpii) Evening of June 12, 2022



Apparent trajectory of the star behind the Moon, viewed from Montréal

Both diagrams: M. Jobin, Rio Tinto Alcan Planetarium; Moon images: NASA SVS