

Moon Bows Out for the Perseids

Conditions are nearly ideal for the summer's best meteor shower.

The timing for this year's **Perseid meteor shower** is almost as good as it gets. **The peak is expected on the morning of August 13th**, and for a change the Moon will not be a concern. Instead of dashing hopes, the 8%-illuminated crescent will provide a fitting coda, rising an hour and a half before the start of astronomical twilight.

Observers blessed with dark skies may see up to 90 meteors per hour. Your results will vary, depending on the amount of local light pollution and when you choose to watch. I live on the

outskirts of a moderate-size city that floods much of the southern sky with artificial light. At best I've bagged 40 Perseids in an hour, more than enough for a fulfilling experience.

If you're prepared to seek dark skies, consult the interactive light pollution map at lightpollutionmap.info. With your mouse, drag the center of the map to your desired location, then use the scroll wheel to zoom in. Areas color-coded in purple, red, and yellow are overrun with artificial illumination, while those in blue and gray are dark

and conducive to meteor watching. Click anywhere on the map for details about a particular site, including its Bortle sky-brightness classification.

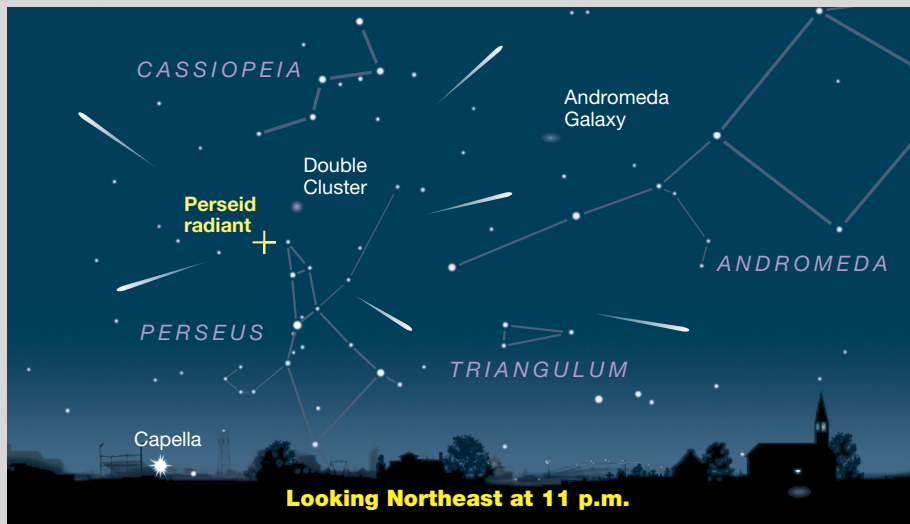
Data from NASA's All Sky Fireball Network reveal that the Perseids blast out more *fireballs* (meteors of magnitude -3 or brighter) than any other shower. This may be due to the jumbo-size nucleus of **the shower's parent, Comet Swift-Tuttle**. At 26 km (16 mi) across, it's more than three times larger than Halley's Comet. Big comets typically release more material than smaller ones, and many of the fragments are weighty enough to spawn brilliant meteors.

Earth crosses Swift-Tuttle's debris trail starting in mid-July and exits around September 1st. The Perseid peak occurs when we enter the densest part of that stream in mid-August. Although we call the Perseids a shower, they're more like an intermittent drizzle. Distances between individual particles range from 96 to 160 km — a span that would take more than an hour to drive at freeway speeds.

The smallest bits of debris are the size of sand grains and scratch out modest flashes. Larger ones are pebble-size, weighing a few grams, and create more impressive streaks. Perseids strike the atmosphere at more than 200,000 km/h and pack a considerable kinetic punch. Impact and deceleration both

◀ Astrophotographer Petr Horálek made this composite self-portrait at Seč Lake in the Iron Mountains of the Czech Republic during the 2020 Perseids. He captured 109 meteors over four nights in a series of 30-second exposures shot with a modified Canon EOS 6D camera and Samyang 12-mm, f/2.8 lens. This month the Perseid meteor shower peaks on the night of August 12–13 under a mostly moonless sky.





ablate the meteoroid and etch a bright trail of energized atmospheric gases that make the bright flash of light we see. Such streaks typically last about one second, and though they measure less than 1 meter (3 ft) across, they can stretch for tens of kilometers.

A 2020 report based on photographs made by the Tajikistan fireball network from 2007 to 2011 determined that the 29 Perseid fireballs recorded had masses of up to 20 grams (0.7 oz), while a 1997 study of two Perseids of magnitude -11 yielded masses of 40 g and 80 g each. Perseid spectra display lines of calcium, magnesium, sodium, silicon, and iron that match well with the composition of carbonaceous chondrite (CC) meteorites. Given that CCs are often fragile, it's not surprising that no known Swift-Tuttle fragments have survived atmospheric entry. But, as noted in the June issue (page 50), vaporized comet crumbs producing a "soot" serve as condensation nuclei for the formation of noctilucent clouds in Earth's mesosphere.

Although the shower climaxes during the early morning hours of the 13th, it's worth starting your watch at nightfall on the 12th, around 9:30 to 10:00 p.m. local daylight time. Meteor numbers will be lower at that time because the *radiant* (the point from which the meteors appear to stream) in the constellation Perseus sits low in the northeastern sky. However, if you have children and want to get them to bed at a reasonable hour, an evening session is still worth-

while. Set out reclining chairs and face east or southeast. Be patient and you should see a few Perseids streak across the sky. Any time spent with children under the stars counts as quality time.

The later you stay up the higher the radiant climbs and the more meteors you'll be able to see. I like to observe for an hour or so late in the evening, then set the alarm for 2 a.m. and watch until dawn. In the morning hours, Perseus stands high in the northeastern sky, so face south or north (whichever direction is darkest where you live) and tip your recliner about 30° from horizontal. That way you'll be gazing up at higher altitudes where atmospheric dimming is least. Remember to bring a blanket — it's surprising how quickly an inactive body loses heat on a clear night, even in summer.

If you plan on photographing the event, use a tripod-mounted camera at ISO 1600 and equipped with an intervalometer set to take successive 30-second exposures. My default lens is a 16–35-mm zoom dialed in to about 20-mm, with the aperture wide open at f/2.8. If dew is a problem where you live, try rubber-banding a pair of chemical hand warmers around the top and bottom of the lens to keep the optics clear and dry.

As the camera automatically does its work, relax and enjoy a night of serenity and surprise — both of which you'll experience in equal measure during the Perseid meteor shower.***