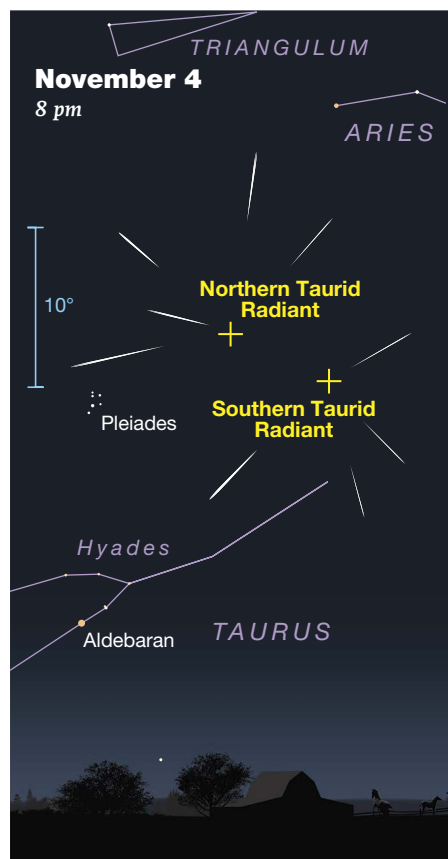


Three Minor Meteor Showers

TUCKED BETWEEN October's modest Orionids and December's abundant Geminids, three minor showers keep the meteor pipeline flowing through November. They include the **Northern (NTA) and Southern (STA) Taurid streams and the well-known Leonids**. All of them occur under dark, nearly moonless circumstances this year.



The **Southern Taurids** have two components, the second of which reaches **maximum on the night of November 4–5**. The **Northern Taurids** get their turn **the night of November 11–12**. Both streams have wide windows of visibility from 9 p.m. to 5 a.m. and feature bright, slow fireballs traveling at around 27 kilometers per second (61,000 mph), half the speed of the Perseids.

The showers' average hourly rate in a pristine sky is a mere five per hour, so try netting meteors with a tripod-mounted digital camera and an intervalometer. I use a 16-mm or 20-mm wide-angle lens set to its maximum aperture, an ISO of 1600 or 2500, and exposures between 20 and 30 seconds.

The **Leonid meteor shower** is famous for its **meteor storms**, which recur approximately every 33 years, the orbital period of its parent comet, 55P/Tempel-Tuttle. Unfortunately, astronomers expect a dearth of storms until 2099. Meteor counts in these off years drop to around 15 or fewer per hour. The Moon is near first quarter **on the night of maximum, November 17-18**, so best viewing will be from 1 a.m. till dawn. Should you manage to observe the full trifecta, you'll be ready for what could be the year's most spectacular meteor display — December's Geminids.***