Best 2005 Meteor Showers

The best meteor showers to try to view are those that peak in intensity when the moon will not be in the sky. Generally, this means that the best showers to view are those where the moon is near New phase to perhaps First Quarter phase, when the moon will set about midnight, as most showers are best after midnight when the radiant is typically higher.

In 2005, the best will be the Perseid meteor shower which peaks on Friday, August 12 with the moon near First Quarter. The meteor shower will be active for about a week on either side of this date, and the moon will be out of the morning sky.

The moon does not cooperate at all for any of the other major northern hemisphere showers like the Quadrantids, Lyrids, Aquarids, Orionids, Leonids, or Geminids. The Geminids, typically one of the best showers of they year falls this year at Full Moon, and so all but the brightest of its meteors will be obscured by the brightness of the sky.

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Shower Name	Peak Date	ZHR Rate	Radiant Pos.	Time Highest
Quadrantids	Jan. 03	90	15h +50°	8:48 AM
Lyrids	Apr. 21	15	18.3h +34°	4:16 AM
Eta Aquarids	May 4	20	22.5h +00°	7:36 AM
Delta Aquarids	July 29	20	22.6h -16°	2:12 AM
Perseids	Aug. 12	100	03.1h +58°	5:44 AM
Orionids	Oct. 21	20	06.4h +16°	4:20 AM
Leonids	Nov. 18	var.	10.3h +22°	6:26 AM
Geminids	Dec. 14	95	07.5h +33°	2:00 AM
Ursids	Dec. 22	20	14.5h +75°	8:26 AM

Collecting Micrometeorites

Meteoric debris rains down onto the Earth's surface in the form of dust every day. A sample of this debris can be collected from indoors or outdoors (preferred) by laying down a large piece of white paper or plastic. After allowing several hours for material to collect on it, collect the sheet by rolling the sides up, gently tapping the material into the center of the sheet. Particles may also be collected from roof run-off into guttering.

Next, pass a magnet under the sheet while gently tilting the paper to get rid of the non-metallic debris. Next, inspect the remaining debris using a magnifying glass or microscope. The microscope is preferred as the micrometeorites are more readily identified under higher magnification (10-20X). Look for dark spherical particles with pitted surfaces, which are micrometeorites showing sign of their fiery re-entry!

For more info ...

International Meteor Organization
http://www.imo.net/

Astronomical League
http://www.astroleague.org/al/obsclubs/meteor/metobs.html

Gary Kronk's Comets and Meteor Showers
http://comets.amsmeteors.org/

Collecting Micrometeorites
http://www.rockhounds.com/rockshop/micromet.html

Observing Meteor Showers

Norfolk Astronomical Society
http://groups.hamptonroads.com/NAS/

Meteoroids, Meteors, and Meteorites

Meteoroids are meteors out in space. While some are believed to be asteroidal and planetary in origin, most are believed to originate from cometary debris. Most are small, no bigger than a grain of sand. They travel through space typically at speeds that average about 40 km/sec. Earth's orbital speed is about 30 km/sec. They are thus fast enough to catch and strike Earth head-on or from behind.

Meteors are meteoroids that have entered our atmosphere. Friction with our atmosphere causes them to heat up and glow to visibility. Meteors begin to vaporize and become visible between 80 to 110 km (50 to 70 miles) up, and on average are completely vaporized by the time they reach 60 to 80 km (40 to 50 miles) up.

Meteors may be sporadic or shower related. Sporadic meteors are those not related to any known meteor shower, can appear in any part of the sky, and moving in any direction. Under ideal conditions, 8 to 10 sporadic meteors can be seen each hour.

Shower related meteors will appear to originate from a specific region of the sky known as the "radiant". They can appear in any region of the sky and move in any direction, but their paths will trace back to the same sky region. Showers are named after the constellation the radiant resides in, and most all are believed to be related to comets. They occur annually about the same date, as the Earth crosses the orbital plane of the comet and encounters the debris. Depending on the amount and width of the debris trails, activity can occur over several days or in some cases, peak only for a few hours. Theproximity to Earth of the parent comet can affect the richness of the display. Indeed, some showers are weak when the comet is farthest from Earth and are considered irregular due to their variable rates.

Meteorites, which are meteors that make it all the way to the ground, on the other hand are believed to be mostly fragments from asteroids, not cometary debris. To survive the fiery passage through our atmosphere, they must be the size of a walnut or larger. Meteorites come in various compositions. Most are stony and hard to distinguish from ordinary stones. Others are rich in iron.

How To Observe

The higher the radiant is in your sky, the more meteors you can expect to see. Most but not all radiants peak in altitude about dawn so the morning hours typically are best. Stare at an area of sky roughly 40 degrees away from the radiant to see the longest trains. Use a reclining lounge chair to lay back and be comfortable on, and to give yourself a greater view of the sky. Get away from the city lights. For every magnitude of stars lost due to skyglow, you lose 60% of the visible meteors.

Making Meteor Counts

Observers can make a valuable scientific contribution by simply making meteor counts, and following rules that will contribute to getting meaningful data. The most often mistake is to observe in a group and count every meteor seen. This is a mistake, and makes your data worthless. Valid meteor counts are single observer rates, and if you didn't see it, don't count it. Pick a standard interval of time (15 minutes) and count only what you see during the interval. Record the actual time interval and count, along with an estimate of limiting magnitude, and percent sky obscuration by trees and buildings. Later you can convert your count per standard time interval into meteors per hour.

You may also take notes on features typical and unusual about the meteors (color, speed, brilliance, do they leave trains, etc.). A separate count of sporadic must also be kept. Serious recorders often work in pairs, one as observer and the other as recorder, switching off duties. A timing device and tape recorder may also be used. Groups interested in your observations are listed later in this brochure.

Identifying Radiants

Radiants for the major meteor showers are well known, but there are numerous minor showers and many yet to be recognized minor showers whose radiants observers can still help to pin down. To do so requires simply plotting meteors on a copy of a star chart. Three points, the rough beginning, middle and end of the path should be marked and a line drawn through them. It is also useful for the observer to note features of each meteor as previously discussed. Plots should include sporadic as well as shower members. Who knows, you may discover a never recognized minor shower!

Photographing Meteors

The best camera to use is a 35mm SLR with its standard 50mm lens wide open. Most sources recommend use of fast film of ISO 400 or greater, though there are some sources that recommend slow films with high reciprocity failure like Kodachrome 64. The camera can be mounted on a tripod for trailed star fields up to the fog limit time of the film, which varies with sky darkness. The camera can also be mounted piggy-back on a telescope or other tracking platform to record star fields with recognizable patterns. Wide-angle lenses cover more sky area but are less efficient at recording meteors. A standard lens of 50mm gives a balance of both good sky coverage with good recording efficiency.