

Lunar Meteor Schedule and Observing Plan for 2021

This form outlines the plan to monitor the moon on a regular basis both inside and outside normal annual showers. Each month, for a total of up to 14 days per month, we are coordinating observations of the Earthshine portion of the moon for background (including the minor showers when they fall during this time) meteor impact flux. A typical run of observations starts three days after New Moon and continues until two days past First Quarter. The run resumes two days before Last Quarter and continues until three days prior to New Moon. The actual interval will depend on the lunar elevation and elongation as well as the ability of the observer to control stray light in one's system.

Shower	Activity	Maximum Date	Radiant		V_{∞} km/s	r	ZHR	
			λ_{\odot}	α				δ
Antihelion Source (ANT)	Dec 10 – Sep 10	Mar-Apr, late May, late June		Varies	Varies	30	3.0	4
Quadrantids (010 QUA)	Dec 28 - Jan 12	Jan 03	283.15°	230°	+49°	41	2.1	110
γ-Ursae Minorids (404 GUM)	Jan 10 - Jan 22	Jan 19	298°	228°	+67°	31	3.0	3
α-Centaurids (102 ACE)	Jan 31 - Feb 20	Feb 08	319.2°	210°	-59°	58	2.0	6
γ -Normids (118 GNO)	Feb 25 - Mar 28	Mar 14	354°	239°	-50°	56	2.4	6
Lyrids (006 LYR)	Apr 14 - Apr 30	Apr 22	32.32°	271°	+34°	49	2.1	18
π -Puppids (137 PPU)	Apr 15 - Apr 28	Apr 23	33.5°	110°	-45°	18	2.0	Var
η-Aquiriids (031 ETA)	Apr 19 - May 28	May 05	45.5°	338°	-01°	66	2.4	50
η-Lyrids (145 ELY)	May 03 - May 14	May 08	48.0°	287°	+44°	43	3.0	3
June Bootids (170 JBO)	Jun 22 - Jul 02	Jun 27	95.7°	224°	+48°	18	2.2	Var
Piscis Austr. (183 PAU)	Jul 15 - Aug 10	Jul 29	125°	341°	-30°	35	3.2	5
South. δ-Aqr (005 SDA)	Jul 12 - Aug 23	Jul 30	127°	340°	-16°	41	2.5	25
α-Capricorn. (001 CAP)	Jul 03 - Aug 15	Jul 30	127°	307°	-10°	23	2.5	5
Perseids (007 PER)	Jul 17 - Aug 24	Aug 12	140.0°	48°	+58°	59	2.2	100
κ-Cygnids (012 KCG)	Aug 03 - Aug 25	Aug 17	145°	286°	+59°	25	3.0	3
Aurigids (206 AUR)	Aug 28 - Sep 05	Sep 01	158.6°	91°	+39°	66	2.5	6
Sep. ϵ -Per (208 SPE)	Sep 05 - Sep 21	Sep 09	166.7°	48°	+40°	64	3.0	5
Oct. Camelop. (281 OCT)	Oct 05 - Oct 06	Oct 05	192.58°	164°	+79°	47	2.5	5
Draconids (009 DRA)	Oct 06 - Oct 10	Oct 08	195.4°	262°	+54°	20	2.6	10
S. Taurids (002 STA)	Sep 10 - Nov 20	Oct 10	197°	32°	+09°	27	2.3	5
δ-Aurigids (224 DAU)	Oct 10 - Oct 18	Oct 11	198°	84°	+44°	64	3.0	2
ϵ -Geminids (023 EGE)	Oct 14 - Oct 27	Oct 18	205°	102°	+27°	70	3.0	3
Orionids (008 ORI)	Oct 02 - Nov 07	Oct 21	208°	95°	+16°	66	2.5	20
Leo Minorids (022 LMI)	Oct 19 - Oct 27	Oct 24	211°	162°	+37°	62	3.0	2
N. Taurids (017 NTA)	Oct 20 - Dec 10	Nov 12	230°	58°	+22°	29	2.3	5
Leonids (013 LEO)	Nov 06 - Nov 30	Nov 17	235.27°	152°	+22°	71	2.5	15
α -Monocerotids (246 AMO)	Nov 15 - Nov 25	Nov 21	239.32°	117°	+01°	65	2.4	Var
Nov. Ori. (250 NOO)	Nov 13 - Dec 06	Nov 28	246°	91°	+16°	44	3.0	3
Phoenicids (254 PHO)	Nov 28 - Dec 09	Dec 02	250.0°	18°	-53°	18	2.8	Var
Puppis-Vel. (301 PUP)	Dec 01 - Dec 15	(Dec 7)	(255°)	123°	-45°	40	2.9	10
Monocerot. (019 MON)	Dec 05 - Dec 20	Dec 09	257°	100°	+08°	41	3.0	3
σ-Hydris (016 HYD)	Dec 03 - Dec 20	Dec 09	260°	127°	+02°	58	3.0	7
Geminids (004 GEM)	Dec 04 - Dec 20	Dec 14	262.2°	112°	+33°	35	2.6	150
Com. Berenic. (020 COM)	Dec 12 - Dec 23	Dec 16	264°	175°	+18°	65	3.0	3
Dec. L Minorids (032 DLM)	Dec 05 - Feb 04	Dec 19	268°	161°	+30°	64	3.0	5
Ursids (015 URS)	Dec 17 - Dec 26	Dec 22	270.7°	217°	+76°	33	3.0	10

Table. Working list of meteor showers, courtesy of the International Meteor Organization.

Observations of the moon during annual showers will occur during routine monthly observations, but observers who are limited in terms of time spent observing are encouraged to plan for annual showers first of all and to observe for a day or two either side of (and including) shower maximum.

The table on the previous page, from the Working list of meteor showers published annually at www.imo.net (the International Meteor Organization) shows information about the annual showers. Entries in bold delineate a shower that is favored for lunar activity, that is, when maximum occurs during the specified interval. The shower name and IMO designation is given in the first column. The interval of activity is presented in the second column with the date of maximum (Earth-based) in the third column. The velocity of the meteoroids at infinity is presented in the next column, which is followed by the population index. The population index, r , is a measure of the distribution of meteoroid sizes at maximum. A larger value of r indicates a larger proportion of smaller particles and is less favorable for lunar meteor studies. Smaller r -values indicate more large particles, translating into a greater probability of observing lunar impacts. Finally, the Zenithal Hourly Rate, as observed on Earth, is given.

We encourage observers to watch the moon a day or two before and after the predicted peak date of an annual shower. The difference in ZHR peak time from Earth to the moon is up to ± 7 hours...later for evening phase, earlier for morning phase. Some showers, such as the Orionids, have a broader peak, while others like the Quadrantids have a narrow peak. The dates of monthly observations are given in the next table. The cut-off dates for one's observing program will vary with year and latitude of observer, which affects the ecliptic angle and the lunar visibility.

Last Quarter	Observing Interval	New Moon	Observing Interval	First Quarter
Jan. 6, '21	Jan. 4 - 10	Jan. 13	Jan. 16 - 22	Jan. 20
Feb. 4	Feb. 2 - 8	Feb. 11	Feb. 14 - 21	Feb. 19
Mar. 6	Mar. 4 - 10	Mar. 13	Mar. 16 - 23	Mar. 21
Apr. 4	Apr. 2 - 9	Apr. 12	Apr. 15 - 22	Apr. 20
May 3	Apr. 30 - May 8	May 11	May 14 - 21	May 19
June 2	May 31 - June 7	June 10	June 13 - 20	Jun. 18
July 1	June 29 - July 7	July 10	July 13 - 19	Jul. 17
July 31	July 29 - Aug. 5	Aug. 8	Aug. 11 - 17	Aug. 15
Aug. 30	Aug. 28 - Sep. 4	Sep. 7	Sep. 10 - 15	Sep. 13
Sep. 29	Sep. 27 - Oct. 3	Oct. 6	Oct. 9 - 15	Oct. 13
Oct. 28	Oct. 26 - Nov. 11	Nov. 4	Nov. 7 - 13	Nov. 11
Nov. 27	Nov. 25 - Dec. 1	Dec. 4	Dec. 7 - 13	Dec. 11
Dec. 27	Dec. 25 - 31	Jan. 3, '22	Jan. 6 - 12	Jan. 10

Any questions concerning this plan can be directed to the ALPO Lunar Meteoritic Impact Search Coordinator, Mr. Brian Cudnik, at bmcudnik@gmail.com.