SkyNews Astronomical events for Indian observers

An initiative supported by
The Public Outreach and Education Committee
Of the Astronomical Society of India

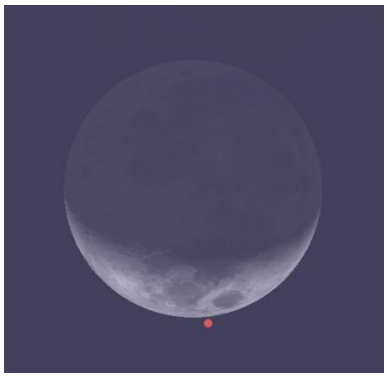
Supplementary Issue # 2
April 2021

MOON ECLIPSES MARS ON 17 APRIL 2021

On the evening of 17 April 2021 the Moon will hide Mars behind it, just like it hides the Sun during a solar eclipse. The event is called an 'occultation' in astronomical parlance. As happens during a solar eclipse, the event will be visible over only some regions on the Earth and the time of the event will differ from place to place.

Around 5:30 pm on 17 April the Moon will occult Mars and the planet will reappear from behind the Moon in about an hour and a half.

At about 6 pm IST on 17 April Mars will be occulted by the Moon



Mars will reappear from behind the Moon about an hour later

The phenomenon is not a rare one. But for a given location, it is not very common either. The last occultation of Mars by the Moon, visible over India in the evening, was on 10 May, 2008.

For India, this will be a mixed bag event. At locations in western India, the occultation will begin when the Sun is still above the horizon.

Since Mars is distinctly visible to the naked eye, this event can be enjoyed without any optical aid. However, a pair of binoculars or a small telescope will be very useful.

Observing the Event

We have tabulated the disappearance and reappearance of Mars for about a hundred locations in India. If you don't find your city in the list, please look for the nearest city; the timings will differ by only a few seconds. It is essential that you be ready at least 30 minutes before the event.

On 17 April the angle between the Sun and the Moon will be nearly 60°; **yet, one must exercise utmost care when sighting the Moon**, either with the naked eye or through a pair of binoculars or a telescope.

First, sight the Moon. Then look for Mars to its east, which is towards the side away from its illuminated side (see the first image above). If the Sun has already set in your location, Mars will be easily visible.

As you continue to watch, you will find the separation between Mars and the Moon decreasing. Finally, you will see Mars going behind the Moon. It will take about

nine seconds for Mars to disappear completely behind the Moon.

The Daytime Challenge

At locations where the Sun is still above the horizon, try to see if you can spot Mars. Over the last few years, many amateur astronomers have successfully photographed the Moon while the Sun is still above the horizon. It is a good exercise, therefore, to see if Mars can also be seen or at least photographed at that time. If you do spot the planet, do inform us about the time and location of your observation, and also let us know what instrument you used. This will be very useful scientific information.

Reappearance

Reappearance will be a little more difficult to catch because you must know exactly from what point on the Moon Mars will reappear. You may take the help of the Moon map given below. For example, an observer in Indore may concentrate between locations 4 and 8. Someone in southern India may focus on the region between 2 and 7.

Please email your observations to the Director, Nehru Planetarium, at director.np1977@gmail.com.

Live Webcast of the Event

Some organisations will webcast this event live. Please visit https://astron-soc.in/outreach/activities/sky-event-related/moonmars2021/ for a list of those who will webcast it live.

Those who are planning to webcast it live are requested to share their link at scipop@gmail.com. To get your camera ready for the live webcast, please visit https://diyastronomy.wordpress.com/diy-electronic-eyepiece/ .

Technical Information

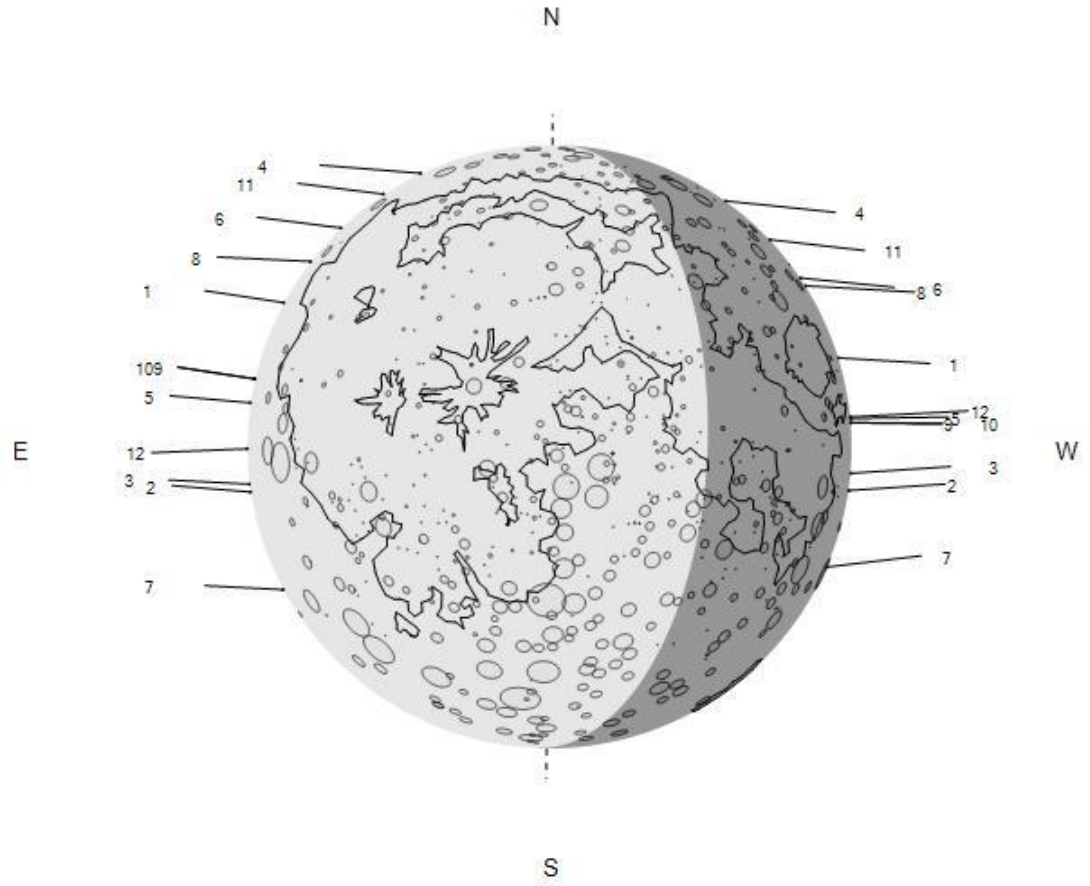
Elongation of Mars:	58.7°
Time taken for light to travel from Mars to Earth:	15m52s
Magnitude of Mars:	1.5
Angular diameter of Mars:	4.90"
Phase of Mars:	0.92
Time for Mars' disk to completely disappear or reappear:	~ 9 seconds
Moon illumination:	18.4% waxing

Table 1

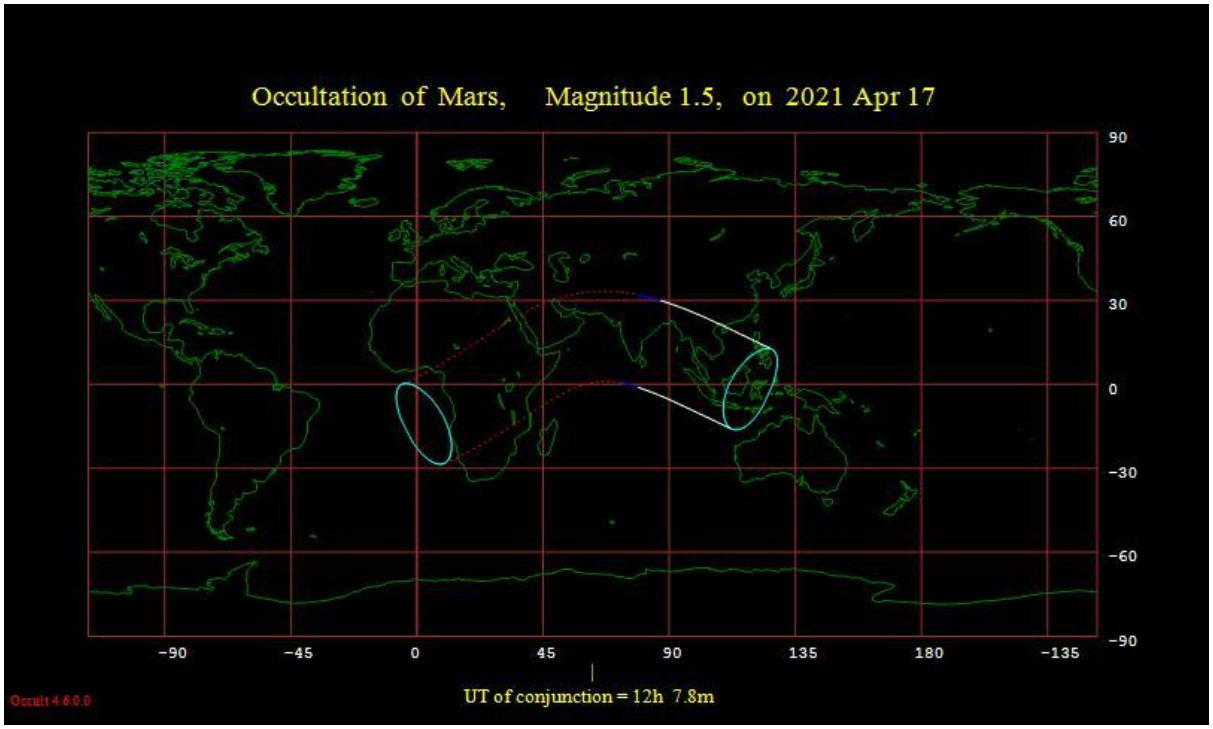
Timings of disappearance and reappearance for some major locations. A blank under the Sun altitude indicates that the Sun is well below the horizon

	Locations	Disappearance				Reappearance		
		Time IST	Sun alt	Moon alt		Time IST	Sun alt	Moon alt
1	Ahmedabad	17:34:59	19	77		19:13:14	-4	55
2	Bengaluru	17:49:21	10	66		19:33:02		43
3	Chennai	17:57:46	5	62		19:38:12		40
4	Guwahati	18:39:37		46		19:21:13		37
5	Hyderabad	17:50:17	9	67		19:32:17		44
6	Jaipur	17:52:44	12	71		19:08:59	-5	54
7	Kanyakumari	17:56:24	7	62		19:30:17		42
8	Kolkata	18:22:12	-6	52		19:34:10		36
9	Mumbai	17:31:52	19	76		19:19:45	-6	52
10	Mumbai South	17:31:45	19	76		19:19:41	-6	52
11	New Delhi	18:02:07	9	67		19:04:10	-4	54
12	Port Blair	18:29:48		43		19:54:42		24

Lunar map showing where the disappearance and reappearance will take place. The numbers correspond to the location numbers mentioned above



World map of Mars Occultation



The line colours have the following meanings:

Cyan: The curves of occultation D (disappearance) or R (reappearance) at moonrise or moonset

White continuous line: The northern and southern occultation limits (graze paths), with the event occurring during the dark hours

Blue continuous line: Occultation limits, event in twilight

Red dotted line: Occultation limits, event in daylight

Timings of disappearance and reappearance of Mars for locations in India

Disappearance

	Location	Time (IST)	Sun alt	Moon alt
1	Agartala	18:32:18	-11	48
2	Agra	17:59:47	9	67
3	Ahmedabad	17:34:59	19	77
4	Ahmednagar	17:38:23	16	73
5	Aizawl	18:36:02		45
6	Ajmer	17:47:56	14	73
7	Almora	18:13:38	5	63
8	Alwar	17:56:47	11	69
9	Ambala	18:08:02	8	66
10	Ambikapur	18:08:24	2	60
11	Amritsar	18:09:42	10	67
12	Asansol	18:20:06	-4	54
13	Aurangabad	17:40:46	15	73
14	Balasore	18:17:16	-4	54
15	Belgaum	17:37:09	16	72
16	Bengaluru	17:49:22	10	66
17	Bhavnagar	17:31:54	20	78
18	Bhopal	17:50:52	11	69
19	Bhubaneswar	18:13:16	-3	56
20	Bhuj	17:25:59	24	82
21	Bikaner	17:48:08	16	74
22	Bilaspur	18:04:05	3	62
23	Chandigarh	18:10:07	8	66
24	Chennai	17:57:46	5	62
25	Chennai	17:57:46	5	62
26	Coimbatore	17:49:38	10	65
27	Cuttack	18:13:18	-2	56
28	Darjeeling	18:31:44	-7	51
29	Dehradun	18:11:57	7	64
30	Dhanbad	18:18:41	-4	55
31	Dimapur	18:45:14		43
32	Durg	18:00:40	5	63
33	Erode	17:51:35	9	64
34	Gandhinagar	17:35:33	19	77
35	Gangtok	18:33:53	-8	50
36	Ghaziabad	18:02:52	9	67

Disappearance (continued)

	Location	Time (IST)	Sun alt	Moon alt
37	Gorakhpur	18:15:43	0	59
38	Gulbarga	17:44:56	12	69
39	Guntur	17:56:40	6	63
40	Guwahati	18:39:45		46
41	Gwalior	17:58:23	9	67
42	Haridwar	18:10:19	7	65
43	Howrah	18:22:16	-6	52
44	Hyderabad	17:50:20	9	67
45	Imphal	18:42:02		43
46	Imphal	18:42:05		43
47	Indore	17:45:10	13	72
48	Jabalpur	17:58:36	7	65
49	Jagdalpur	18:01:24	4	62
50	Jaipur	17:52:39	12	71
51	Jaisalmer	17:37:44	20	78
52	Jalandhar	18:08:51	9	67
53	Jalpaiguri	18:31:24	-8	51
54	Jamnagar	17:26:01	23	81
55	Jhansi	17:57:51	8	67
56	Jodhpur	17:42:30	17	76
57	Jorhat	18:51:35		41
58	Kanpur	18:05:33	5	64
59	Kanyakumari	17:56:24	7	62
60	Kasaragod	17:44:21	12	68
61	Katihar	18:25:18	-6	53
62	Kavaratti	17:34:53	18	71
63	Kohima	18:45:30		42
64	Kolhapur	17:36:06	16	73
65	Kolkata	18:22:23	-6	52
66	Kota	17:49:42	12	71
67	Kozhikode	17:45:14	12	67
68	Kullu	18:23:15	5	62
69	Kurukshetra	18:06:10	9	67
70	Lucknow	18:08:25	4	63
71	Ludhiana	18:08:00	9	67
72	Madurai	17:54:57	7	63
73	Mangalore	17:40:09	14	70
74	Mathura	17:59:59	9	67
75	Mohali	18:09:31	8	66

Disappearance (continued)

	Location	Time (IST)	Sun alt	Moon alt
76	Mumbai	17:31:52	19	76
77	Mumbai (South)	17:31:45	19	76
78	Mysore	17:46:50	11	67
79	Nagercoil	17:55:52	7	62
80	Nagpur	17:53:52	8	67
81	Nainital	18:12:01	5	63
82	Nashik	17:35:43	17	75
83	New Delhi	18:02:07	9	67
84	Ooty	17:48:09	10	66
85	Panaji	17:34:51	17	73
86	Panipat	18:04:06	9	67
87	Pathankot	18:18:59	7	65
88	Patiala	18:06:31	9	67
89	Patna	18:18:07	-2	57
90	Port Blair	18:29:48		43
91	Prayagraj	18:08:00	3	62
92	Puducherry	17:57:25	5	62
93	Pune	17:35:08	17	75
94	Puri	18:12:59	-3	56
95	Raipur	18:01:46	4	63
96	Rajkot	17:28:08	22	80
97	Ranchi	18:13:28	-1	57
98	Ranikhet	18:13:05	5	63
99	Ratlam	17:43:24	15	73
100	Ratnagiri	17:32:51	18	75
101	Rohtak	18:01:00	10	68
102	Sambalpur	18:08:53	0	59
103	Shillong	18:38:13		46
104	Shimla	18:13:43	7	65
105	Silchar	18:38:43		45
106	Silvassa	17:33:20	19	76
107	Sonipat	18:02:45	9	67
108	Surat	17:33:32	19	77
109	Tawang	18:47:17		44
110	Tezpur	18:45:14		44
111	Thane	17:32:23	19	76
112	Thiruvananthapuram	17:53:40	8	63
113	Thrissur	17:47:47	11	66
114	Tirupati	17:54:40	7	64

Disappearance (continued)

	Location	Time (IST)	Sun alt	Moon alt
115	Udaipur	17:41:02	17	75
116	Udupi	17:39:17	15	70
117	Ujjain	17:45:35	13	72
118	Vadodara	17:36:05	18	76
119	Varanasi	18:11:15	1	60
120	Vellore	17:54:24	7	63
121	Vijayapura	17:41:13	14	71
122	Vijayawada	17:57:12	5	63
123	Visakh'ptnm	18:05:06	1	59
124	Warangal	17:53:55	7	65

Reappearance

	Location	Time (IST)	Sun alt	Moon alt
1	Agartala	19:30:56		35
2	Agra	19:11:16	-7	51
3	Ahmedabad	19:13:14	-4	55
4	Ahmednagar	19:23:32	-9	50
5	Aizawl	19:31:23		33
6	Ajmer	19:08:40	-4	55
7	Almora	19:01:35	-6	52
8	Alwar	19:07:51	-5	53
9	Ambala	18:54:41	-2	56
10	Ambikapur	19:28:47		42
11	Amritsar	18:44:10	3	60
12	Asansol	19:30:08		38
13	Aurangabad	19:23:41	-9	49
14	Balasore	19:35:50		37
15	Belgaum	19:25:30	-10	49
16	Bengaluru	19:33:04		43
17	Bhavnagar	19:14:33	-4	55
18	Bhopal	19:21:19	-10	49
19	Bhubaneswar	19:37:36		37
20	Bhuj	19:06:32	1	59
21	Bikaner	19:01:13	0	58
22	Bilaspur	19:30:06		42
23	Chandigarh	18:52:31	-1	57
24	Chennai	19:38:11		40
25	Chennai	19:38:12		40
26	Coimbatore	19:31:18		43

Reappearance (continued)

	Location	Time (IST)	Sun alt	Moon alt
27	Cuttack	19:37:01		37
28	Darjeeling	19:17:31		41
29	Dehradun	18:56:02	-3	55
30	Dhanbad	19:29:30		39
31	Dimapur	19:21:19		35
32	Durg	19:30:59		43
33	Erode	19:33:03		42
34	Gandhinagar	19:13:02	-3	55
35	Gangtok	19:16:03		41
36	Ghaziabad	19:04:18	-4	53
37	Gorakhpur	19:17:25		45
38	Gulbarga	19:29:25		46
39	Guntur	19:36:41		41
40	Guwahati	19:21:03		37
41	Gwalior	19:14:27	-8	50
42	Haridwar	18:58:29	-4	54
43	Howrah	19:33:58		36
44	Hyderabad	19:32:23		44
45	Imphal	19:26:40		33
46	Imphal	19:26:37		33
47	Indore	19:19:56	-8	51
48	Jabalpur	19:25:01		46
49	Jagdalpur	19:35:14		41
50	Jaipur	19:09:01	-5	54
51	Jaisalmer	19:00:32	2	60
52	Jalandhar	18:47:40	1	59
53	Jalpaiguri	19:20:00		40
54	Jamnagar	19:08:48	0	58
55	Jhansi	19:17:06	-9	49
56	Jodhpur	19:06:22	-2	57
57	Jorhat	19:14:41		36
58	Kanpur	19:16:07	-10	48
59	Kanyakumari	19:30:17		42
60	Kasaragod	19:29:22		45
61	Katihar	19:24:06		40
62	Kavaratti	19:19:34	-8	50
63	Kohima	19:22:20		34
64	Kolhapur	19:24:28	-9	49
65	Kolkata	19:34:00		36

Reappearance (continued)

	Location	Time (IST)	Sun alt	Moon alt
66	Kota	19:15:09	-7	52
67	Kozhikode	19:28:29		45
68	Kullu	18:40:42	1	59
69	Kurukshetra	18:57:08	-2	56
70	Lucknow	19:15:18	-10	48
71	Ludhiana	18:50:32	0	58
72	Madurai	19:33:18		41
73	Mangalore	19:26:42	-11	47
74	Mathura	19:09:27	-6	52
75	Mohali	18:52:40	-1	57
76	Mumbai	19:19:45	-6	52
77	MumbaiS	19:19:41	-6	52
78	Mysore	19:30:54		44
79	Nagercoil	19:30:05		42
80	Nagpur	19:28:04		45
81	Nainital	19:02:35	-6	52
82	Nashik	19:20:30	-7	52
83	New Delhi	19:04:10	-4	54
84	Ooty	19:30:49		44
85	Panaji	19:24:06	-9	49
86	Panipat	19:00:22	-3	55
87	Pathankot	18:37:18	4	61
88	Patiala	18:54:34	-1	56
89	Patna	19:22:53		42
90	Port Blair	19:54:41		24
91	Prayagraj	19:20:56		45
92	Puducherry	19:37:36		40
93	Pune	19:22:21	-8	51
94	Puri	19:38:29		37
95	Raipur	19:31:17		42
96	Rajkot	19:10:41	-1	57
97	Ranchi	19:30:43		40
98	Ranikhet	19:01:08	-5	52
99	Ratlam	19:17:17	-7	52
100	Ratnagiri	19:22:11	-8	51
101	Rohtak	19:02:19	-3	55
102	Sambalpur	19:33:22		40
103	Shillong	19:23:53		36
104	Shimla	18:50:12	-1	57

Reappearance (continued)

	Location	Time (IST)	Sun alt	Moon alt
105	Silchar	19:26:54		34
106	Silvassa	19:18:33	-6	53
107	Sonipat	19:02:26	-4	54
108	Surat	19:16:52	-5	54
109	Tawang	19:11:41		39
110	Tezpur	19:17:47		37
111	Thane	19:19:43	-6	52
112	Thiruvananthapuram	19:29:12		43
113	Thrissur	19:29:08		44
114	Tirupati	19:36:25		41
115	Udaipur	19:12:00	-4	55
116	Udupi	19:26:36	-11	47
117	Ujjain	19:18:55	-8	51
118	Vadodara	19:15:48	-5	54
119	Varanasi	19:22:19		44
120	Vellore	19:36:10		41
121	Vijayapura	19:27:34	-11	47
122	Vijayawada	19:36:46		41
123	Visakhapatnam	19:39:07		38
124	Warangal	19:33:31		43

These pages are contributed by:
Arvind Paranjpye (paranjpye.arvind@gmail.com) (http://arvindparanjpye.blogspot.com/) and Anjanee Rao (rao.anjanee@gmail.com)