

## Phenomena of Jupiter's Moons, January 2015

For telescopic observers, here is the complete list of phenomena involving Jupiter's four bright moons and the planet's disk or shadow. The first columns give the date and midpoint time of the event in Universal Time. Next is the satellite involved: I for Io, II Europa, III Ganymede, or IV Callisto. This is followed by the type of event: Oc for an occultation of the satellite behind Jupiter's limb, Ec for an eclipse by Jupiter's shadow, Tr for a transit of the satellite across the planet's face, or Sh for the satellite casting its tiny black shadow onto Jupiter. An occultation or eclipse begins when the satellite disappears (D) and ends when it reappears (R). A transit or shadow passage begins at ingress (I) and ends at egress (E). Each event is gradual, lasting several minutes. These predictions are courtesy IMCCE / Paris Observatory.

<b>Jan. 1</b>	3:18	III.Ec.D		23:58	III.Tr.E		1:26	I.Tr.I		13:51	I.Oc.R
	4:00	II.Ec.D	<b>Jan. 5</b>	14:36	I.Ec.D		2:34	II.Tr.I	<b>Jan. 15</b>	8:13	I.Sh.I
	4:27	I.Sh.I		17:40	I.Oc.R		3:05	I.Sh.E		8:45	I.Tr.I
	5:15	I.Tr.I	<b>Jan. 6</b>	11:51	I.Sh.I		3:44	I.Tr.E		9:07	II.Ec.D
	6:44	I.Sh.E		11:56	II.Sh.I		4:09	II.Sh.E		10:30	I.Sh.E
	7:32	I.Tr.E		12:34	I.Tr.I		5:29	II.Tr.E		11:02	I.Tr.E
	8:30	II.Oc.R		13:24	II.Tr.I		22:02	I.Ec.D		11:15	III.Ec.D
	10:19	III.Oc.R		14:08	I.Sh.E	<b>Jan. 11</b>	0:59	I.Oc.R		13:03	II.Oc.R
<b>Jan. 2</b>	1:39	I.Ec.D		14:51	II.Sh.E		19:16	I.Sh.I		16:48	IV.Ec.D
	4:47	I.Oc.R		14:51	I.Tr.E		19:50	II.Ec.D		17:05	III.Oc.R
	22:39	II.Sh.I		16:19	II.Tr.E		19:53	I.Tr.I		21:42	IV.Ec.R
	22:55	I.Sh.I	<b>Jan. 7</b>	9:05	I.Ec.D		21:16	III.Sh.I		21:52	IV.Oc.D
	23:41	I.Tr.I		9:13	IV.Sh.I		21:34	I.Sh.E	<b>Jan. 16</b>	2:39	IV.Oc.R
<b>Jan. 3</b>	0:15	II.Tr.I		12:06	I.Oc.R		22:10	I.Tr.E		5:27	I.Ec.D
	1:12	I.Sh.E		14:02	IV.Sh.E		23:44	III.Tr.I		8:18	I.Oc.R
	1:33	II.Sh.E		15:49	IV.Tr.I		23:55	II.Oc.R	<b>Jan. 17</b>	2:41	I.Sh.I
	1:58	I.Tr.E		20:31	IV.Tr.E	<b>Jan. 12</b>	0:54	III.Sh.E		3:11	I.Tr.I
	3:09	II.Tr.E	<b>Jan. 8</b>	6:20	I.Sh.I		3:21	III.Tr.E		3:51	II.Sh.I
	20:08	I.Ec.D		6:34	II.Ec.D		16:30	I.Ec.D		4:52	II.Tr.I
	23:14	I.Oc.R		7:00	I.Tr.I		19:25	I.Oc.R		4:59	I.Sh.E
<b>Jan. 4</b>	17:17	II.Ec.D		7:17	III.Ec.D	<b>Jan. 13</b>	13:45	I.Sh.I		5:28	I.Tr.E
	17:19	III.Sh.I		8:37	I.Sh.E		14:19	I.Tr.I		6:46	II.Sh.E
	17:23	I.Sh.I		9:17	I.Tr.E		14:33	II.Sh.I		7:46	II.Tr.E
	18:08	I.Tr.I		10:47	II.Oc.R		15:43	II.Tr.I		23:56	I.Ec.D
	19:40	I.Sh.E		13:44	III.Oc.R		16:02	I.Sh.E	<b>Jan. 18</b>	2:44	I.Oc.R
	20:21	III.Tr.I	<b>Jan. 9</b>	3:33	I.Ec.D		16:36	I.Tr.E		21:10	I.Sh.I
	20:25	I.Tr.E		6:33	I.Oc.R		17:27	II.Sh.E		21:37	I.Tr.I
	20:56	III.Sh.E	<b>Jan. 10</b>	0:48	I.Sh.I		18:37	II.Tr.E		22:24	II.Ec.D
	21:39	II.Oc.R		1:15	II.Sh.I	<b>Jan. 14</b>	10:59	I.Ec.D		23:27	I.Sh.E

	23:54	I.Tr.E		12:24	I.Sh.E		23:03	I.Sh.I		17:20	I.Oc.R
<b>Jan. 19</b>	1:15	III.Sh.I		12:46	I.Tr.E		23:20	I.Tr.I	<b>Jan. 29</b>	12:00	I.Sh.I
	2:10	II.Oc.R		15:13	III.Ec.D	<b>Jan. 26</b>	0:57	II.Ec.D		12:12	I.Tr.I
	3:04	III.Tr.I		15:17	II.Oc.R		1:21	I.Sh.E		14:14	II.Ec.D
	4:53	III.Sh.E		20:23	III.Oc.R		1:38	I.Tr.E		14:17	I.Sh.E
	6:42	III.Tr.E	<b>Jan. 23</b>	7:22	I.Ec.D		4:24	II.Oc.R		14:29	I.Tr.E
	18:24	I.Ec.D		10:02	I.Oc.R		5:13	III.Sh.I		17:30	II.Oc.R
	21:10	I.Oc.R	<b>Jan. 24</b>	3:11	IV.Sh.I		6:21	III.Tr.I		19:12	III.Ec.D
<b>Jan. 20</b>	15:38	I.Sh.I		4:35	I.Sh.I		8:52	III.Sh.E		23:40	III.Oc.R
	16:03	I.Tr.I		4:55	I.Tr.I		9:59	III.Tr.E	<b>Jan. 30</b>	9:16	I.Ec.D
	17:09	II.Sh.I		6:19	IV.Tr.I		20:19	I.Ec.D		11:46	I.Oc.R
	17:55	I.Sh.E		6:28	II.Sh.I		22:54	I.Oc.R	<b>Jan. 31</b>	6:28	I.Sh.I
	17:59	II.Tr.I		6:52	I.Sh.E	<b>Jan. 27</b>	17:32	I.Sh.I		6:38	I.Tr.I
	18:20	I.Tr.E		7:08	II.Tr.I		17:46	I.Tr.I		8:46	I.Sh.E
	20:04	II.Sh.E		7:12	I.Tr.E		19:45	II.Sh.I		8:55	I.Tr.E
	20:54	II.Tr.E		8:00	IV.Sh.E		19:49	I.Sh.E		9:04	II.Sh.I
<b>Jan. 21</b>	12:53	I.Ec.D		9:22	II.Sh.E		20:04	I.Tr.E		9:23	II.Tr.I
	15:36	I.Oc.R		10:02	II.Tr.E		20:15	II.Tr.I		11:59	II.Sh.E
<b>Jan. 22</b>	10:06	I.Sh.I		11:02	IV.Tr.E		22:40	II.Sh.E		12:18	II.Tr.E
	10:29	I.Tr.I	<b>Jan. 25</b>	1:50	I.Ec.D		23:10	II.Tr.E			
	11:40	II.Ec.D		4:28	I.Oc.R	<b>Jan. 28</b>	14:47	I.Ec.D			

## Phenomena of Jupiter's Moons, February 2015

For telescopic observers, here is the complete list of phenomena involving Jupiter's four bright moons and the planet's disk or shadow. The first columns give the date and midpoint time of the event in Universal Time. Next is the satellite involved: I for Io, II Europa, III Ganymede, or IV Callisto. This is followed by the type of event: Oc for an occultation of the satellite behind Jupiter's limb, Ec for an eclipse by Jupiter's shadow, Tr for a transit of the satellite across the planet's face, or Sh for the satellite casting its tiny black shadow onto Jupiter. An occultation or eclipse begins when the satellite disappears (D) and ends when it reappears (R). A transit or shadow passage begins at ingress (I) and ends at egress (E). Each event is gradual, lasting several minutes. These predictions are courtesy IMCCE / Paris Observatory.

<b>Feb. 1</b>	3:45	I.Ec.D		16:13	I.Tr.E	<b>Feb. 10</b>	0:03	I.Oc.D		14:17	II.Sh.I
	6:12	I.Oc.R		16:48	II.Ec.D		1:12	IV.Tr.E		16:48	II.Tr.E
	10:49	IV.Ec.D		19:43	II.Oc.R		2:00	IV.Sh.E		17:12	II.Sh.E
	16:53	IV.Oc.R		23:11	III.Ec.D		2:26	I.Ec.R	<b>Feb. 15</b>	7:21	I.Oc.D
<b>Feb. 2</b>	0:57	I.Sh.I	<b>Feb. 6</b>	2:55	III.Oc.R		21:13	I.Tr.I		9:52	I.Ec.R
	1:04	I.Tr.I		11:10	I.Ec.D		21:19	I.Sh.I	<b>Feb. 16</b>	4:31	I.Tr.I
	3:14	I.Sh.E		13:30	I.Oc.R		23:30	I.Tr.E		4:45	I.Sh.I
	3:21	I.Tr.E	<b>Feb. 7</b>	8:21	I.Tr.I		23:37	I.Sh.E		6:48	I.Tr.E
	3:31	II.Ec.D		8:22	I.Sh.I	<b>Feb. 11</b>	0:45	II.Tr.I		7:02	I.Sh.E
	6:37	II.Oc.R		10:39	I.Tr.E		0:59	II.Sh.I		8:11	II.Oc.D
	9:11	III.Sh.I		10:40	I.Sh.E		3:40	II.Tr.E		11:31	II.Ec.R
	9:37	III.Tr.I		11:38	II.Tr.I		3:53	II.Sh.E		16:08	III.Tr.I
	12:50	III.Sh.E		11:41	II.Sh.I		18:29	I.Oc.D		17:08	III.Sh.I
	13:15	III.Tr.E		14:33	II.Tr.E		20:55	I.Ec.R		19:46	III.Tr.E
	22:13	I.Ec.D		14:35	II.Sh.E	<b>Feb. 12</b>	15:39	I.Tr.I		20:46	III.Sh.E
<b>Feb. 3</b>	0:38	I.Oc.R	<b>Feb. 8</b>	5:37	I.Oc.D		15:48	I.Sh.I	<b>Feb. 17</b>	1:47	I.Oc.D
	19:25	I.Sh.I		7:58	I.Ec.R		17:56	I.Tr.E		4:21	I.Ec.R
	19:30	I.Tr.I	<b>Feb. 9</b>	2:47	I.Tr.I		18:05	I.Sh.E		22:57	I.Tr.I
	21:43	I.Sh.E		2:51	I.Sh.I		19:04	II.Oc.D		23:13	I.Sh.I
	21:47	I.Tr.E		5:05	I.Tr.E		22:14	II.Ec.R	<b>Feb. 18</b>	1:14	I.Tr.E
	22:22	II.Sh.I		5:08	I.Sh.E	<b>Feb. 13</b>	2:32	III.Oc.D		1:31	I.Sh.E
	22:30	II.Tr.I		5:57	II.Oc.D		6:51	III.Ec.R		2:10	IV.Oc.D
<b>Feb. 4</b>	1:17	II.Sh.E		8:57	II.Ec.R		12:55	I.Oc.D		3:01	II.Tr.I
	1:25	II.Tr.E		12:52	III.Tr.I		15:24	I.Ec.R		3:35	II.Sh.I
	16:42	I.Ec.D		13:09	III.Sh.I	<b>Feb. 14</b>	10:05	I.Tr.I		5:55	II.Tr.E
	19:04	I.Oc.R		16:30	III.Tr.E		10:16	I.Sh.I		6:30	II.Sh.E
<b>Feb. 5</b>	13:54	I.Sh.I		16:48	III.Sh.E		12:22	I.Tr.E		9:43	IV.Ec.R
	13:55	I.Tr.I		20:28	IV.Tr.I		12:34	I.Sh.E		20:13	I.Oc.D
	16:11	I.Sh.E		21:11	IV.Sh.I		13:53	II.Tr.I		22:50	I.Ec.R

<b>Feb. 19</b>	17:23	I.Tr.I		19:04	II.Tr.E	<b>Feb. 25</b>	0:41	I.Tr.I		21:24	I.Tr.E
	17:42	I.Sh.I		19:49	II.Sh.E		1:07	I.Sh.I		21:53	I.Sh.E
	19:40	I.Tr.E	<b>Feb. 22</b>	9:05	I.Oc.D		2:58	I.Tr.E		23:32	II.Oc.D
	19:59	I.Sh.E		11:47	I.Ec.R		3:25	I.Sh.E	<b>Feb. 27</b>	3:23	II.Ec.R
	21:18	II.Oc.D	<b>Feb. 23</b>	6:15	I.Tr.I		5:17	II.Tr.I		9:07	III.Oc.D
<b>Feb. 20</b>	0:49	II.Ec.R		6:39	I.Sh.I		6:12	II.Sh.I		14:49	III.Ec.R
	5:49	III.Oc.D		8:32	I.Tr.E		8:11	II.Tr.E		16:24	I.Oc.D
	10:50	III.Ec.R		8:56	I.Sh.E		9:07	II.Sh.E		19:13	I.Ec.R
	14:39	I.Oc.D		10:25	II.Oc.D		21:58	I.Oc.D	<b>Feb. 28</b>	13:33	I.Tr.I
	17:18	I.Ec.R		14:06	II.Ec.R	<b>Feb. 26</b>	0:44	I.Ec.R		14:05	I.Sh.I
<b>Feb. 21</b>	11:49	I.Tr.I		19:26	III.Tr.I		10:43	IV.Tr.I		15:51	I.Tr.E
	12:10	I.Sh.I		21:07	III.Sh.I		15:11	IV.Sh.I		16:22	I.Sh.E
	14:06	I.Tr.E		23:03	III.Tr.E		15:28	IV.Tr.E		18:26	II.Tr.I
	14:28	I.Sh.E	<b>Feb. 24</b>	0:45	III.Sh.E		19:07	I.Tr.I		19:31	II.Sh.I
	16:09	II.Tr.I		3:31	I.Oc.D		19:36	I.Sh.I		21:20	II.Tr.E
	16:54	II.Sh.I		6:16	I.Ec.R		19:59	IV.Sh.E		22:25	II.Sh.E

## Phenomena of Jupiter's Moons, March 2015

For telescopic observers, here is the complete list of phenomena involving Jupiter's four bright moons and the planet's disk or shadow. The first columns give the date and midpoint time of the event in Universal Time. Next is the satellite involved: I for Io, II Europa, III Ganymede, or IV Callisto. This is followed by the type of event: Oc for an occultation of the satellite behind Jupiter's limb, Ec for an eclipse by Jupiter's shadow, Tr for a transit of the satellite across the planet's face, or Sh for the satellite casting its tiny black shadow onto Jupiter. An occultation or eclipse begins when the satellite disappears (D) and ends when it reappears (R). A transit or shadow passage begins at ingress (I) and ends at egress (E). Each event is gradual, lasting several minutes. These predictions are courtesy IMCCE / Paris Observatory.

<b>Mar. 1</b>	10:50	I.Oc.D		5:58	II.Ec.R		8:43	III.Sh.E		1:59	II.Tr.E
	13:42	I.Ec.R		12:28	III.Oc.D		10:05	I.Ec.R		3:38	II.Sh.E
<b>Mar. 2</b>	8:00	I.Tr.I		16:36	IV.Oc.D	<b>Mar. 11</b>	4:12	I.Tr.I		6:16	IV.Tr.E
	8:33	I.Sh.I		18:10	I.Oc.D		4:56	I.Sh.I		9:12	IV.Sh.I
	10:17	I.Tr.E		18:48	III.Ec.R		6:29	I.Tr.E		13:58	IV.Sh.E
	10:51	I.Sh.E		21:08	I.Ec.R		7:14	I.Sh.E		14:23	I.Oc.D
	12:40	II.Oc.D		21:25	IV.Oc.R		9:54	II.Tr.I		17:32	I.Ec.R
	16:41	II.Ec.R		22:53	IV.Ec.D		11:26	II.Sh.I	<b>Mar. 16</b>	11:32	I.Tr.I
	22:46	III.Tr.I	<b>Mar. 7</b>	3:45	IV.Ec.R		12:48	II.Tr.E		12:22	I.Sh.I
<b>Mar. 3</b>	1:05	III.Sh.I		15:19	I.Tr.I		14:20	II.Sh.E		13:49	I.Tr.E
	2:23	III.Tr.E		15:59	I.Sh.I	<b>Mar. 12</b>	1:30	I.Oc.D		14:39	I.Sh.E
	4:44	III.Sh.E		17:36	I.Tr.E		4:34	I.Ec.R		17:16	II.Oc.D
	5:17	I.Oc.D		18:16	I.Sh.E		22:39	I.Tr.I		21:51	II.Ec.R
	8:10	I.Ec.R		20:45	II.Tr.I		23:25	I.Sh.I	<b>Mar. 17</b>	5:37	III.Tr.I
<b>Mar. 4</b>	2:26	I.Tr.I		22:08	II.Sh.I	<b>Mar. 13</b>	0:56	I.Tr.E		8:50	I.Oc.D
	3:02	I.Sh.I		23:39	II.Tr.E		1:42	I.Sh.E		9:04	III.Sh.I
	4:43	I.Tr.E	<b>Mar. 8</b>	1:02	II.Sh.E		4:06	II.Oc.D		9:14	III.Tr.E
	5:19	I.Sh.E		12:36	I.Oc.D		8:33	II.Ec.R		12:00	I.Ec.R
	7:35	II.Tr.I		15:37	I.Ec.R		15:53	III.Oc.D		12:42	III.Sh.E
	8:49	II.Sh.I	<b>Mar. 9</b>	9:45	I.Tr.I		19:56	I.Oc.D	<b>Mar. 18</b>	5:59	I.Tr.I
	10:29	II.Tr.E		10:28	I.Sh.I		22:47	III.Ec.R		6:51	I.Sh.I
	11:43	II.Sh.E		12:03	I.Tr.E		23:03	I.Ec.R		8:16	I.Tr.E
	23:43	I.Oc.D		12:45	I.Sh.E	<b>Mar. 14</b>	17:05	I.Tr.I		9:08	I.Sh.E
<b>Mar. 5</b>	2:39	I.Ec.R		14:57	II.Oc.D		17:53	I.Sh.I		12:16	II.Tr.I
	20:52	I.Tr.I		19:15	II.Ec.R		19:22	I.Tr.E		14:02	II.Sh.I
	21:30	I.Sh.I	<b>Mar. 10</b>	2:10	III.Tr.I		20:11	I.Sh.E		15:09	II.Tr.E
	23:10	I.Tr.E		5:05	III.Sh.I		23:05	II.Tr.I		16:56	II.Sh.E
	23:48	I.Sh.E		5:47	III.Tr.E	<b>Mar. 15</b>	0:44	II.Sh.I	<b>Mar. 19</b>	3:17	I.Oc.D
<b>Mar. 6</b>	1:48	II.Oc.D		7:03	I.Oc.D		1:31	IV.Tr.I		6:29	I.Ec.R

<b>Mar. 20</b>	0:26	I.Tr.I		19:26	I.Ec.R		14:39	II.Tr.I	<b>Mar. 29</b>	0:00	I.Sh.E
	1:19	I.Sh.I	<b>Mar. 23</b>	7:44	IV.Oc.D		16:39	II.Sh.I		3:52	II.Tr.I
	2:43	I.Tr.E		12:36	IV.Oc.R		17:32	II.Tr.E		5:58	II.Sh.I
	3:37	I.Sh.E		13:20	I.Tr.I		19:32	II.Sh.E		6:45	II.Tr.E
	6:26	II.Oc.D		14:17	I.Sh.I	<b>Mar. 26</b>	5:05	I.Oc.D		8:51	II.Sh.E
	11:08	II.Ec.R		15:37	I.Tr.E		8:24	I.Ec.R		18:00	I.Oc.D
	19:22	III.Oc.D		16:34	I.Sh.E	<b>Mar. 27</b>	2:14	I.Tr.I		21:21	I.Ec.R
	21:44	I.Oc.D		16:56	IV.Ec.D		3:14	I.Sh.I	<b>Mar. 30</b>	15:09	I.Tr.I
	23:02	III.Oc.R		19:37	II.Oc.D		4:31	I.Tr.E		16:12	I.Sh.I
	23:07	III.Ec.D		21:47	IV.Ec.R		5:31	I.Sh.E		17:26	I.Tr.E
<b>Mar. 21</b>	0:58	I.Ec.R	<b>Mar. 24</b>	0:26	II.Ec.R		8:49	II.Oc.D		18:29	I.Sh.E
	2:47	III.Ec.R		9:09	III.Tr.I		13:44	II.Ec.R		22:01	II.Oc.D
	18:53	I.Tr.I		10:38	I.Oc.D		22:56	III.Oc.D	<b>Mar. 31</b>	3:01	II.Ec.R
	19:48	I.Sh.I		12:46	III.Tr.E		23:33	I.Oc.D		12:27	I.Oc.D
	21:10	I.Tr.E		13:04	III.Sh.I	<b>Mar. 28</b>	2:36	III.Oc.R		12:44	III.Tr.I
	22:05	I.Sh.E		13:55	I.Ec.R		2:53	I.Ec.R		15:50	I.Ec.R
<b>Mar. 22</b>	1:28	II.Tr.I		16:41	III.Sh.E		3:06	III.Ec.D		16:21	III.Tr.E
	3:21	II.Sh.I	<b>Mar. 25</b>	7:47	I.Tr.I		6:47	III.Ec.R		17:02	III.Sh.I
	4:21	II.Tr.E		8:45	I.Sh.I		20:42	I.Tr.I		17:09	IV.Tr.I
	6:14	II.Sh.E		10:04	I.Tr.E		21:43	I.Sh.I		20:40	III.Sh.E
	16:11	I.Oc.D		11:03	I.Sh.E		22:58	I.Tr.E		21:55	IV.Tr.E

## Phenomena of Jupiter's Moons, April 2015

For telescopic observers, here is the complete list of phenomena involving Jupiter's four bright moons and the planet's disk or shadow. The first columns give the date and midpoint time of the event in Universal Time. Next is the satellite involved: I for Io, II Europa, III Ganymede, or IV Callisto. This is followed by the type of event: Oc for an occultation of the satellite behind Jupiter's limb, Ec for an eclipse by Jupiter's shadow, Tr for a transit of the satellite across the planet's face, or Sh for the satellite casting its tiny black shadow onto Jupiter. An occultation or eclipse begins when the satellite disappears (D) and ends when it reappears (R). A transit or shadow passage begins at ingress (I) and ends at egress (E). Each event is gradual, lasting several minutes. These predictions are courtesy IMCCE / Paris Observatory.

<b>Apr. 1</b>	3:14	IV.Sh.I		8:34	II.Sh.I		12:14	I.Ec.R		8:13	II.Ec.R
	7:57	IV.Sh.E		9:12	II.Tr.E		15:48	IV.Ec.R		16:09	I.Oc.D
	9:36	I.Tr.I		11:27	II.Sh.E	<b>Apr. 10</b>	5:55	I.Tr.I		19:40	I.Ec.R
	10:40	I.Sh.I		19:50	I.Oc.D		7:04	I.Sh.I		20:10	III.Tr.I
	11:53	I.Tr.E		23:17	I.Ec.R		8:11	I.Tr.E		23:46	III.Tr.E
	12:57	I.Sh.E	<b>Apr. 6</b>	16:59	I.Tr.I		9:21	I.Sh.E	<b>Apr. 15</b>	1:01	III.Sh.I
	17:05	II.Tr.I		18:06	I.Sh.I		13:41	II.Oc.D		4:38	III.Sh.E
	19:16	II.Sh.I		19:16	I.Tr.E		18:55	II.Ec.R		13:18	I.Tr.I
	19:58	II.Tr.E		20:23	I.Sh.E	<b>Apr. 11</b>	3:14	I.Oc.D		14:30	I.Sh.I
	22:09	II.Sh.E	<b>Apr. 7</b>	0:27	II.Oc.D		6:18	III.Oc.D		15:35	I.Tr.E
<b>Apr. 2</b>	6:55	I.Oc.D		5:37	II.Ec.R		6:43	I.Ec.R		16:47	I.Sh.E
	10:19	I.Ec.R		14:18	I.Oc.D		9:58	III.Oc.R		22:03	II.Tr.I
<b>Apr. 3</b>	4:04	I.Tr.I		16:24	III.Tr.I		11:06	III.Ec.D	<b>Apr. 16</b>	0:29	II.Sh.I
	5:09	I.Sh.I		17:45	I.Ec.R		14:46	III.Ec.R		0:55	II.Tr.E
	6:21	I.Tr.E		20:01	III.Tr.E	<b>Apr. 12</b>	0:22	I.Tr.I		3:21	II.Sh.E
	7:26	I.Sh.E		21:01	III.Sh.I		1:33	I.Sh.I		10:38	I.Oc.D
	11:14	II.Oc.D	<b>Apr. 8</b>	0:38	III.Sh.E		2:39	I.Tr.E		14:09	I.Ec.R
	16:19	II.Ec.R		11:27	I.Tr.I		3:50	I.Sh.E	<b>Apr. 17</b>	7:46	I.Tr.I
<b>Apr. 4</b>	1:22	I.Oc.D		12:35	I.Sh.I		8:48	II.Tr.I		8:59	I.Sh.I
	2:35	III.Oc.D		13:44	I.Tr.E		11:11	II.Sh.I		9:45	IV.Tr.I
	4:48	I.Ec.R		14:52	I.Sh.E		11:40	II.Tr.E		10:03	I.Tr.E
	6:15	III.Oc.R		19:33	II.Tr.I		14:03	II.Sh.E		11:16	I.Sh.E
	7:07	III.Ec.D		21:52	II.Sh.I		21:41	I.Oc.D		14:31	IV.Tr.E
	10:47	III.Ec.R		22:25	II.Tr.E	<b>Apr. 13</b>	1:12	I.Ec.R		16:10	II.Oc.D
	22:31	I.Tr.I		23:50	IV.Oc.D		18:50	I.Tr.I		21:15	IV.Sh.I
	23:38	I.Sh.I	<b>Apr. 9</b>	0:45	II.Sh.E		20:01	I.Sh.I		21:31	II.Ec.R
<b>Apr. 5</b>	0:48	I.Tr.E		4:42	IV.Oc.R		21:07	I.Tr.E	<b>Apr. 18</b>	1:57	IV.Sh.E
	1:55	I.Sh.E		8:46	I.Oc.D		22:18	I.Sh.E		5:06	I.Oc.D
	6:19	II.Tr.I		10:59	IV.Ec.D	<b>Apr. 14</b>	2:55	II.Oc.D		8:38	I.Ec.R

	10:05	III.Oc.D		21:35	I.Ec.R		6:59	I.Oc.D		23:51	I.Sh.I
	13:45	III.Oc.R	<b>Apr. 22</b>	0:00	III.Tr.I		10:33	I.Ec.R	<b>Apr. 28</b>	0:53	I.Tr.E
	15:06	III.Ec.D		3:36	III.Tr.E		13:57	III.Oc.D		2:08	I.Sh.E
	18:46	III.Ec.R		5:01	III.Sh.I		16:55	IV.Oc.D		7:59	II.Oc.D
<b>Apr. 19</b>	2:15	I.Tr.I		8:37	III.Sh.E		17:37	III.Oc.R		13:26	II.Ec.R
	3:28	I.Sh.I		15:11	I.Tr.I		19:05	III.Ec.D		19:56	I.Oc.D
	4:31	I.Tr.E		16:25	I.Sh.I		21:47	IV.Oc.R		23:30	I.Ec.R
	5:44	I.Sh.E		17:28	I.Tr.E		22:45	III.Ec.R	<b>Apr. 29</b>	3:54	III.Tr.I
	11:19	II.Tr.I		18:42	I.Sh.E	<b>Apr. 26</b>	4:08	I.Tr.I		7:31	III.Tr.E
	13:47	II.Sh.I	<b>Apr. 23</b>	0:35	II.Tr.I		5:03	IV.Ec.D		9:01	III.Sh.I
	14:11	II.Tr.E		3:05	II.Sh.I		5:23	I.Sh.I		12:37	III.Sh.E
	16:39	II.Sh.E		3:27	II.Tr.E		6:25	I.Tr.E		17:05	I.Tr.I
	23:34	I.Oc.D		5:57	II.Sh.E		7:40	I.Sh.E		18:20	I.Sh.I
<b>Apr. 20</b>	3:07	I.Ec.R		12:31	I.Oc.D		9:51	IV.Ec.R		19:22	I.Tr.E
	20:43	I.Tr.I		16:04	I.Ec.R		13:52	II.Tr.I		20:37	I.Sh.E
	21:56	I.Sh.I	<b>Apr. 24</b>	9:39	I.Tr.I		16:23	II.Sh.I	<b>Apr. 30</b>	3:09	II.Tr.I
	23:00	I.Tr.E		10:54	I.Sh.I		16:44	II.Tr.E		5:41	II.Sh.I
<b>Apr. 21</b>	0:13	I.Sh.E		11:56	I.Tr.E		19:15	II.Sh.E		6:01	II.Tr.E
	5:26	II.Oc.D		13:11	I.Sh.E	<b>Apr. 27</b>	1:27	I.Oc.D		8:33	II.Sh.E
	10:49	II.Ec.R		18:42	II.Oc.D		5:02	I.Ec.R		14:25	I.Oc.D
	18:02	I.Oc.D	<b>Apr. 25</b>	0:07	II.Ec.R		22:36	I.Tr.I		17:59	I.Ec.R

## Phenomena of Jupiter's Moons, May 2015

For telescopic observers, here is the complete list of phenomena involving Jupiter's four bright moons and the planet's disk or shadow. The first columns give the date and midpoint time of the event in Universal Time. Next is the satellite involved: I for Io, II Europa, III Ganymede, or IV Callisto. This is followed by the type of event: Oc for an occultation of the satellite behind Jupiter's limb, Ec for an eclipse by Jupiter's shadow, Tr for a transit of the satellite across the planet's face, or Sh for the satellite casting its tiny black shadow onto Jupiter. An occultation or eclipse begins when the satellite disappears (D) and ends when it reappears (R). A transit or shadow passage begins at ingress (I) and ends at egress (E). Each event is gradual, lasting several minutes. These predictions are courtesy IMCCE / Paris Observatory.

<b>May 1</b>	11:34	I.Tr.I		4:03	I.Sh.E		3:04	III.Ec.D		22:11	I.Sh.I
	12:49	I.Sh.I		10:34	II.Oc.D		6:44	III.Ec.R		23:12	I.Tr.E
	13:50	I.Tr.E		16:02	II.Ec.R		7:58	I.Tr.I	<b>May 14</b>	0:27	I.Sh.E
	15:06	I.Sh.E		21:51	I.Oc.D		9:13	I.Sh.I		8:23	II.Tr.I
	21:16	II.Oc.D	<b>May 6</b>	1:25	I.Ec.R		10:14	I.Tr.E		10:53	II.Sh.I
<b>May 2</b>	2:44	II.Ec.R		7:53	III.Tr.I		11:30	I.Sh.E		11:15	II.Tr.E
	8:53	I.Oc.D		11:29	III.Tr.E		19:04	II.Tr.I		13:45	II.Sh.E
	12:28	I.Ec.R		13:00	III.Sh.I		21:35	II.Sh.I		18:15	I.Oc.D
	17:53	III.Oc.D		16:37	III.Sh.E		21:56	II.Tr.E		21:49	I.Ec.R
	21:33	III.Oc.R		19:00	I.Tr.I	<b>May 11</b>	0:27	II.Sh.E	<b>May 15</b>	15:25	I.Tr.I
	23:04	III.Ec.D		20:15	I.Sh.I		5:17	I.Oc.D		16:39	I.Sh.I
<b>May 3</b>	2:44	III.Ec.R		21:17	I.Tr.E		8:52	I.Ec.R		17:41	I.Tr.E
	6:02	I.Tr.I		22:32	I.Sh.E	<b>May 12</b>	2:26	I.Tr.I		18:56	I.Sh.E
	7:18	I.Sh.I	<b>May 7</b>	5:45	II.Tr.I		3:42	I.Sh.I	<b>May 16</b>	2:30	II.Oc.D
	8:19	I.Tr.E		8:17	II.Sh.I		4:43	I.Tr.E		7:57	II.Ec.R
	9:35	I.Sh.E		8:37	II.Tr.E		5:59	I.Sh.E		12:45	I.Oc.D
	16:27	II.Tr.I		11:09	II.Sh.E		10:54	IV.Oc.D		16:18	I.Ec.R
	18:59	II.Sh.I		16:20	I.Oc.D		13:11	II.Oc.D	<b>May 17</b>	1:57	III.Oc.D
	19:19	II.Tr.E		19:54	I.Ec.R		15:47	IV.Oc.R		5:37	III.Oc.R
	21:51	II.Sh.E	<b>May 8</b>	13:29	I.Tr.I		18:39	II.Ec.R		7:04	III.Ec.D
<b>May 4</b>	3:17	IV.Tr.I		14:44	I.Sh.I		23:07	IV.Ec.D		9:54	I.Tr.I
	3:22	I.Oc.D		15:45	I.Tr.E		23:46	I.Oc.D		10:43	III.Ec.R
	6:57	I.Ec.R		17:01	I.Sh.E	<b>May 13</b>	3:20	I.Ec.R		11:08	I.Sh.I
	8:04	IV.Tr.E		23:52	II.Oc.D		3:52	IV.Ec.R		12:11	I.Tr.E
	15:17	IV.Sh.I	<b>May 9</b>	5:20	II.Ec.R		11:55	III.Tr.I		13:25	I.Sh.E
	19:56	IV.Sh.E		10:48	I.Oc.D		15:31	III.Tr.E		21:42	II.Tr.I
<b>May 5</b>	0:31	I.Tr.I		14:23	I.Ec.R		17:00	III.Sh.I	<b>May 18</b>	0:11	II.Sh.I
	1:47	I.Sh.I		21:53	III.Oc.D		20:36	III.Sh.E		0:34	II.Tr.E
	2:48	I.Tr.E	<b>May 10</b>	1:33	III.Oc.R		20:55	I.Tr.I		3:03	II.Sh.E

	7:14	I.Oc.D		13:54	II.Tr.E		3:14	II.Tr.E		18:56	II.Sh.E
	10:47	I.Ec.R		13:56	IV.Sh.E		5:38	II.Sh.E		22:10	I.Oc.D
<b>May 19</b>	4:23	I.Tr.I		16:20	II.Sh.E		9:11	I.Oc.D	<b>May 29</b>	1:39	I.Ec.R
	5:37	I.Sh.I		20:12	I.Oc.D		12:41	I.Ec.R		5:40	IV.Oc.D
	6:40	I.Tr.E		23:44	I.Ec.R	<b>May 26</b>	6:20	I.Tr.I		10:33	IV.Oc.R
	7:54	I.Sh.E	<b>May 22</b>	17:21	I.Tr.I		7:32	I.Sh.I		17:10	IV.Ec.D
	15:50	II.Oc.D		18:34	I.Sh.I		8:37	I.Tr.E		19:19	I.Tr.I
	21:15	II.Ec.R		19:38	I.Tr.E		9:49	I.Sh.E		20:30	I.Sh.I
<b>May 20</b>	1:43	I.Oc.D		20:51	I.Sh.E		18:31	II.Oc.D		21:36	I.Tr.E
	5:15	I.Ec.R	<b>May 23</b>	5:10	II.Oc.D		23:52	II.Ec.R		21:53	IV.Ec.R
	16:00	III.Tr.I		10:34	II.Ec.R	<b>May 27</b>	3:40	I.Oc.D		22:47	I.Sh.E
	19:37	III.Tr.E		14:41	I.Oc.D		7:10	I.Ec.R	<b>May 30</b>	7:52	II.Oc.D
	20:59	III.Sh.I		18:13	I.Ec.R		20:08	III.Tr.I		13:11	II.Ec.R
	21:39	IV.Tr.I	<b>May 24</b>	6:05	III.Oc.D		23:45	III.Tr.E		16:39	I.Oc.D
	22:52	I.Tr.I		9:46	III.Oc.R	<b>May 28</b>	0:49	I.Tr.I		20:08	I.Ec.R
<b>May 21</b>	0:06	I.Sh.I		11:04	III.Ec.D		0:58	III.Sh.I	<b>May 31</b>	10:16	III.Oc.D
	0:35	III.Sh.E		11:51	I.Tr.I		2:01	I.Sh.I		13:48	I.Tr.I
	1:09	I.Tr.E		13:03	I.Sh.I		3:07	I.Tr.E		13:56	III.Oc.R
	2:23	I.Sh.E		14:08	I.Tr.E		4:18	I.Sh.E		14:58	I.Sh.I
	2:26	IV.Tr.E		14:43	III.Ec.R		4:34	III.Sh.E		15:04	III.Ec.D
	9:19	IV.Sh.I		15:20	I.Sh.E		13:42	II.Tr.I		16:06	I.Tr.E
	11:02	II.Tr.I	<b>May 25</b>	0:22	II.Tr.I		16:04	II.Sh.I		17:16	I.Sh.E
	13:29	II.Sh.I		2:47	II.Sh.I		16:34	II.Tr.E		18:43	III.Ec.R

## Phenomena of Jupiter's Moons, June 2015

For telescopic observers, here is the complete list of phenomena involving Jupiter's four bright moons and the planet's disk or shadow. The first columns give the date and midpoint time of the event in Universal Time. Next is the satellite involved: I for Io, II Europa, III Ganymede, or IV Callisto. This is followed by the type of event: Oc for an occultation of the satellite behind Jupiter's limb, Ec for an eclipse by Jupiter's shadow, Tr for a transit of the satellite across the planet's face, or Sh for the satellite casting its tiny black shadow onto Jupiter. An occultation or eclipse begins when the satellite disappears (D) and ends when it reappears (R). A transit or shadow passage begins at ingress (I) and ends at egress (E). Each event is gradual, lasting several minutes. These predictions are courtesy IMCCE / Paris Observatory.

<b>June 1</b>	3:03	II.Tr.I		22:25	I.Sh.I		23:57	II.Oc.D		20:03	I.Tr.E
	5:22	II.Sh.I		23:34	I.Tr.E	<b>June 10</b>	5:06	II.Ec.R		21:06	I.Sh.E
	5:55	II.Tr.E	<b>June 6</b>	0:42	I.Sh.E		7:36	I.Oc.D		22:25	III.Oc.R
	8:14	II.Sh.E		10:35	II.Oc.D		11:00	I.Ec.R		23:02	III.Ec.D
	11:08	I.Oc.D		15:48	II.Ec.R	<b>June 11</b>	4:34	III.Tr.I	<b>June 15</b>	1:04	IV.Oc.D
	14:36	I.Ec.R		16:42	IV.Tr.I		4:46	I.Tr.I		2:40	III.Ec.R
<b>June 2</b>	8:18	I.Tr.I		18:37	I.Oc.D		5:51	I.Sh.I		5:57	IV.Oc.R
	9:27	I.Sh.I		21:29	IV.Tr.E		7:04	I.Tr.E		8:29	II.Tr.I
	10:35	I.Tr.E		22:02	I.Ec.R		8:08	I.Sh.E		10:33	II.Sh.I
	11:44	I.Sh.E	<b>June 7</b>	3:21	IV.Sh.I		8:12	III.Tr.E		11:14	IV.Ec.D
	21:13	II.Oc.D		7:56	IV.Sh.E		8:58	III.Sh.I		11:20	II.Tr.E
<b>June 3</b>	2:29	II.Ec.R		14:29	III.Oc.D		12:34	III.Sh.E		13:24	II.Sh.E
	5:38	I.Oc.D		15:47	I.Tr.I		19:07	II.Tr.I		15:06	I.Oc.D
	9:05	I.Ec.R		16:54	I.Sh.I		21:15	II.Sh.I		15:54	IV.Ec.R
<b>June 4</b>	0:20	III.Tr.I		18:04	I.Tr.E		21:59	II.Tr.E		18:26	I.Ec.R
	2:47	I.Tr.I		18:09	III.Oc.R	<b>June 12</b>	0:06	II.Sh.E	<b>June 16</b>	12:16	I.Tr.I
	3:56	I.Sh.I		19:03	III.Ec.D		2:06	I.Oc.D		13:17	I.Sh.I
	3:57	III.Tr.E		19:11	I.Sh.E		5:28	I.Ec.R		14:33	I.Tr.E
	4:58	III.Sh.I		22:42	III.Ec.R		23:16	I.Tr.I		15:35	I.Sh.E
	5:05	I.Tr.E	<b>June 8</b>	5:45	II.Tr.I	<b>June 13</b>	0:20	I.Sh.I	<b>June 17</b>	2:43	II.Oc.D
	6:13	I.Sh.E		7:58	II.Sh.I		1:33	I.Tr.E		7:43	II.Ec.R
	8:34	III.Sh.E		8:37	II.Tr.E		2:37	I.Sh.E		9:35	I.Oc.D
	16:24	II.Tr.I		10:49	II.Sh.E		13:20	II.Oc.D		12:54	I.Ec.R
	18:40	II.Sh.I		13:07	I.Oc.D		18:25	II.Ec.R	<b>June 18</b>	6:45	I.Tr.I
	19:16	II.Tr.E		16:31	I.Ec.R		20:36	I.Oc.D		7:46	I.Sh.I
	21:31	II.Sh.E	<b>June 9</b>	10:16	I.Tr.I		23:57	I.Ec.R		8:52	III.Tr.I
<b>June 5</b>	0:08	I.Oc.D		11:22	I.Sh.I	<b>June 14</b>	17:46	I.Tr.I		9:03	I.Tr.E
	3:34	I.Ec.R		12:34	I.Tr.E		18:44	III.Oc.D		10:04	I.Sh.E
	21:17	I.Tr.I		13:40	I.Sh.E		18:49	I.Sh.I		12:30	III.Tr.E

	12:58	III.Sh.I		23:02	III.Oc.D		11:35	I.Oc.D		18:53	II.Oc.D
	16:34	III.Sh.E	<b>June 22</b>	2:42	III.Oc.R		14:49	I.Ec.R		23:39	II.Ec.R
	21:51	II.Tr.I		3:01	III.Ec.D	<b>June 25</b>	8:45	I.Tr.I	<b>June 28</b>	0:35	I.Oc.D
	23:50	II.Sh.I		6:39	III.Ec.R		9:41	I.Sh.I		3:46	I.Ec.R
<b>June 19</b>	0:42	II.Tr.E		11:13	II.Tr.I		11:03	I.Tr.E		21:45	I.Tr.I
	2:41	II.Sh.E		13:08	II.Sh.I		11:59	I.Sh.E		22:39	I.Sh.I
	4:05	I.Oc.D		14:05	II.Tr.E		13:10	III.Tr.I	<b>June 29</b>	0:03	I.Tr.E
	7:23	I.Ec.R		15:59	II.Sh.E		16:49	III.Tr.E		0:57	I.Sh.E
<b>June 20</b>	1:15	I.Tr.I		17:05	I.Oc.D		16:57	III.Sh.I		3:22	III.Oc.D
	2:15	I.Sh.I		20:20	I.Ec.R		20:33	III.Sh.E		10:38	III.Ec.R
	3:33	I.Tr.E	<b>June 23</b>	12:18	IV.Tr.I	<b>June 26</b>	0:35	II.Tr.I		13:58	II.Tr.I
	4:32	I.Sh.E		14:15	I.Tr.I		2:25	II.Sh.I		15:42	II.Sh.I
	16:06	II.Oc.D		15:13	I.Sh.I		3:27	II.Tr.E		16:50	II.Tr.E
	21:02	II.Ec.R		16:33	I.Tr.E		5:16	II.Sh.E		18:34	II.Sh.E
	22:35	I.Oc.D		17:05	IV.Tr.E		6:05	I.Oc.D		19:05	I.Oc.D
<b>June 21</b>	1:52	I.Ec.R		17:30	I.Sh.E		9:17	I.Ec.R		22:15	I.Ec.R
	19:45	I.Tr.I		21:22	IV.Sh.I	<b>June 27</b>	3:15	I.Tr.I	<b>June 30</b>	16:15	I.Tr.I
	20:44	I.Sh.I	<b>June 24</b>	1:54	IV.Sh.E		4:10	I.Sh.I		17:08	I.Sh.I
	22:03	I.Tr.E		5:29	II.Oc.D		5:33	I.Tr.E		18:33	I.Tr.E
	23:01	I.Sh.E		10:20	II.Ec.R		6:28	I.Sh.E		19:25	I.Sh.E

## Phenomena of Jupiter's Moons, July 2015

For telescopic observers, here is the complete list of phenomena involving Jupiter's four bright moons and the planet's disk or shadow. The first columns give the date and midpoint time of the event in Universal Time. Next is the satellite involved: I for Io, II Europa, III Ganymede, or IV Callisto. This is followed by the type of event: Oc for an occultation of the satellite behind Jupiter's limb, Ec for an eclipse by Jupiter's shadow, Tr for a transit of the satellite across the planet's face, or Sh for the satellite casting its tiny black shadow onto Jupiter. An occultation or eclipse begins when the satellite disappears (D) and ends when it reappears (R). A transit or shadow passage begins at ingress (I) and ends at egress (E). Each event is gradual, lasting several minutes. These predictions are courtesy IMCCE / Paris Observatory.

<b>July 1</b>	8:17	II.Oc.D		5:41	I.Ec.R		6:06	II.Tr.I	<b>July 14</b>	2:03	I.Ec.R
	12:58	II.Ec.R		23:46	I.Tr.I		7:34	II.Sh.I		20:17	I.Tr.I
	13:35	I.Oc.D	<b>July 6</b>	0:34	I.Sh.I		8:20	IV.Tr.I		20:58	I.Sh.I
	16:43	I.Ec.R		2:04	I.Tr.E		8:58	II.Tr.E		22:35	I.Tr.E
	20:58	IV.Oc.D		2:52	I.Sh.E		10:05	I.Oc.D		23:15	I.Sh.E
<b>July 2</b>	1:50	IV.Oc.R		7:44	III.Oc.D		10:26	II.Sh.E	<b>July 15</b>	13:55	II.Oc.D
	5:17	IV.Ec.D		14:37	III.Ec.R		13:05	IV.Tr.E		17:35	I.Oc.D
	9:54	IV.Ec.R		16:43	II.Tr.I		13:06	I.Ec.R		18:12	II.Ec.R
	10:45	I.Tr.I		18:17	II.Sh.I		15:23	IV.Sh.I		20:32	I.Ec.R
	11:36	I.Sh.I		19:35	II.Tr.E		19:53	IV.Sh.E	<b>July 16</b>	14:47	I.Tr.I
	13:03	I.Tr.E		21:05	I.Oc.D	<b>July 11</b>	7:16	I.Tr.I		15:26	I.Sh.I
	13:54	I.Sh.E		21:08	II.Sh.E		8:00	I.Sh.I		17:05	I.Tr.E
	17:31	III.Tr.I	<b>July 7</b>	0:09	I.Ec.R		9:34	I.Tr.E		17:44	I.Sh.E
	20:56	III.Sh.I		18:16	I.Tr.I		10:18	I.Sh.E	<b>July 17</b>	2:16	III.Tr.I
	21:10	III.Tr.E		19:03	I.Sh.I	<b>July 12</b>	0:30	II.Oc.D		4:54	III.Sh.I
<b>July 3</b>	0:32	III.Sh.E		20:34	I.Tr.E		4:35	I.Oc.D		5:55	III.Tr.E
	3:20	II.Tr.I		21:20	I.Sh.E		4:54	II.Ec.R		8:30	III.Sh.E
	5:00	II.Sh.I	<b>July 8</b>	11:05	II.Oc.D		7:35	I.Ec.R		8:53	II.Tr.I
	6:12	II.Tr.E		15:35	I.Oc.D	<b>July 13</b>	1:46	I.Tr.I		10:09	II.Sh.I
	7:51	II.Sh.E		15:35	II.Ec.R		2:29	I.Sh.I		11:45	II.Tr.E
	8:05	I.Oc.D		18:38	I.Ec.R		4:05	I.Tr.E		12:05	I.Oc.D
	11:12	I.Ec.R	<b>July 9</b>	12:46	I.Tr.I		4:47	I.Sh.E		13:00	II.Sh.E
<b>July 4</b>	5:16	I.Tr.I		13:31	I.Sh.I		12:08	III.Oc.D		15:01	I.Ec.R
	6:05	I.Sh.I		15:04	I.Tr.E		18:37	III.Ec.R	<b>July 18</b>	9:17	I.Tr.I
	7:34	I.Tr.E		15:49	I.Sh.E		19:29	II.Tr.I		9:55	I.Sh.I
	8:23	I.Sh.E		21:53	III.Tr.I		20:52	II.Sh.I		11:35	I.Tr.E
	21:41	II.Oc.D	<b>July 10</b>	0:55	III.Sh.I		22:21	II.Tr.E		12:13	I.Sh.E
<b>July 5</b>	2:17	II.Ec.R		1:32	III.Tr.E		23:05	I.Oc.D		17:15	IV.Oc.D
	2:35	I.Oc.D		4:31	III.Sh.E		23:43	II.Sh.E		22:04	IV.Oc.R

	23:20	IV.Ec.D		16:45	II.Oc.D	<b>July 26</b>	6:10	II.Oc.D		2:37	I.Tr.E
<b>July 19</b>	3:20	II.Oc.D		19:35	I.Oc.D		8:36	I.Oc.D		3:05	I.Sh.E
	3:54	IV.Ec.R		20:49	II.Ec.R		10:08	II.Ec.R		19:35	II.Oc.D
	6:35	I.Oc.D		22:26	I.Ec.R		11:23	I.Ec.R		21:36	I.Oc.D
	7:31	II.Ec.R	<b>July 23</b>	16:48	I.Tr.I	<b>July 27</b>	4:39	IV.Tr.I		23:26	II.Ec.R
	9:29	I.Ec.R		17:21	I.Sh.I		5:49	I.Tr.I	<b>July 30</b>	0:20	I.Ec.R
<b>July 20</b>	3:47	I.Tr.I		19:06	I.Tr.E		6:19	I.Sh.I		18:49	I.Tr.I
	4:24	I.Sh.I		19:39	I.Sh.E		8:07	I.Tr.E		19:16	I.Sh.I
	6:06	I.Tr.E	<b>July 24</b>	6:42	III.Tr.I		8:37	I.Sh.E		21:08	I.Tr.E
	6:42	I.Sh.E		8:54	III.Sh.I		9:21	IV.Tr.E		21:34	I.Sh.E
	16:32	III.Oc.D		10:20	III.Tr.E		9:24	IV.Sh.I	<b>July 31</b>	11:08	III.Tr.I
	22:16	II.Tr.I		11:39	II.Tr.I		13:51	IV.Sh.E		12:53	III.Sh.I
	22:35	III.Ec.R		12:29	III.Sh.E		20:57	III.Oc.D		14:27	II.Tr.I
	23:26	II.Sh.I		12:43	II.Sh.I	<b>July 28</b>	1:03	II.Tr.I		14:46	III.Tr.E
<b>July 21</b>	1:05	I.Oc.D		14:06	I.Oc.D		2:00	II.Sh.I		15:17	II.Sh.I
	1:08	II.Tr.E		14:32	II.Tr.E		2:34	III.Ec.R		16:06	I.Oc.D
	2:17	II.Sh.E		15:34	II.Sh.E		3:06	I.Oc.D		16:28	III.Sh.E
	3:58	I.Ec.R		16:55	I.Ec.R		3:55	II.Tr.E		17:19	II.Tr.E
	22:18	I.Tr.I	<b>July 25</b>	11:18	I.Tr.I		4:51	II.Sh.E		18:08	II.Sh.E
	22:52	I.Sh.I		11:50	I.Sh.I		5:52	I.Ec.R		18:49	I.Ec.R
<b>July 22</b>	0:36	I.Tr.E		13:37	I.Tr.E	<b>July 29</b>	0:19	I.Tr.I			
	1:10	I.Sh.E		14:08	I.Sh.E		0:47	I.Sh.I			

## Phenomena of Jupiter's Moons, August 2015

For telescopic observers, here is the complete list of phenomena involving Jupiter's four bright moons and the planet's disk or shadow. The first columns give the date and midpoint time of the event in Universal Time. Next is the satellite involved: I for Io, II Europa, III Ganymede, or IV Callisto. This is followed by the type of event: Oc for an occultation of the satellite behind Jupiter's limb, Ec for an eclipse by Jupiter's shadow, Tr for a transit of the satellite across the planet's face, or Sh for the satellite casting its tiny black shadow onto Jupiter. An occultation or eclipse begins when the satellite disappears (D) and ends when it reappears (R). A transit or shadow passage begins at ingress (I) and ends at egress (E). Each event is gradual, lasting several minutes. These predictions are courtesy IMCCE / Paris Observatory.

<b>Aug. 1</b>	13:20	I.Tr.I		2:14	I.Ec.R		7:08	I.Oc.D		23:16	II.Sh.E
	13:45	I.Sh.I		20:51	I.Tr.I		7:08	II.Sh.I		23:40	III.Tr.E
	15:38	I.Tr.E		21:11	I.Sh.I		9:30	II.Tr.E	<b>Aug. 15</b>	0:26	III.Sh.E
	16:03	I.Sh.E		23:09	I.Tr.E		9:40	I.Ec.R		17:23	I.Tr.I
<b>Aug. 2</b>	9:01	II.Oc.D		23:29	I.Sh.E		9:59	II.Sh.E		17:34	I.Sh.I
	10:37	I.Oc.D	<b>Aug. 7</b>	15:35	III.Tr.I		10:29	III.Ec.R		19:41	I.Tr.E
	12:45	II.Ec.R		16:52	III.Sh.I	<b>Aug. 12</b>	4:22	I.Tr.I		19:52	I.Sh.E
	13:17	I.Ec.R		17:14	II.Tr.I		4:37	I.Sh.I	<b>Aug. 16</b>	14:38	I.Oc.D
<b>Aug. 3</b>	7:50	I.Tr.I		17:51	II.Sh.I		6:40	I.Tr.E		14:44	II.Oc.D
	8:13	I.Sh.I		18:07	I.Oc.D		6:55	I.Sh.E		17:05	I.Ec.R
	10:09	I.Tr.E		19:13	III.Tr.E	<b>Aug. 13</b>	1:10	IV.Tr.I		17:59	II.Ec.R
	10:31	I.Sh.E		20:06	II.Tr.E		1:17	II.Oc.D	<b>Aug. 17</b>	11:53	I.Tr.I
<b>Aug. 4</b>	1:23	III.Oc.D		20:28	III.Sh.E		1:38	I.Oc.D		12:03	I.Sh.I
	3:50	II.Tr.I		20:43	II.Sh.E		3:24	IV.Sh.I		14:12	I.Tr.E
	4:34	II.Sh.I		20:43	I.Ec.R		4:08	I.Ec.R		14:21	I.Sh.E
	5:07	I.Oc.D	<b>Aug. 8</b>	15:21	I.Tr.I		4:40	II.Ec.R	<b>Aug. 18</b>	9:08	I.Oc.D
	6:31	III.Ec.R		15:39	I.Sh.I		5:47	IV.Tr.E		9:25	II.Tr.I
	6:42	II.Tr.E		17:40	I.Tr.E		7:47	IV.Sh.E		9:42	II.Sh.I
	7:25	II.Sh.E		17:57	I.Sh.E		22:52	I.Tr.I		10:17	III.Oc.D
	7:46	I.Ec.R	<b>Aug. 9</b>	11:52	II.Oc.D		23:05	I.Sh.I		11:34	I.Ec.R
	13:47	IV.Oc.D		12:37	I.Oc.D	<b>Aug. 14</b>	1:11	I.Tr.E		12:17	II.Tr.E
	21:53	IV.Ec.R		15:11	I.Ec.R		1:24	I.Sh.E		12:33	II.Sh.E
<b>Aug. 5</b>	2:20	I.Tr.I		15:22	II.Ec.R		20:02	II.Tr.I		14:28	III.Ec.R
	2:42	I.Sh.I	<b>Aug. 10</b>	9:52	I.Tr.I		20:02	III.Tr.I	<b>Aug. 19</b>	6:24	I.Tr.I
	4:39	I.Tr.E		10:08	I.Sh.I		20:08	I.Oc.D		6:31	I.Sh.I
	5:00	I.Sh.E		12:10	I.Tr.E		20:25	II.Sh.I		8:42	I.Tr.E
	22:26	II.Oc.D		12:26	I.Sh.E		20:51	III.Sh.I		8:49	I.Sh.E
	23:37	I.Oc.D	<b>Aug. 11</b>	5:50	III.Oc.D		22:37	I.Ec.R	<b>Aug. 20</b>	3:39	I.Oc.D
<b>Aug. 6</b>	2:03	II.Ec.R		6:38	II.Tr.I		22:54	II.Tr.E		4:09	II.Oc.D

	6:02	I.Ec.R		19:29	I.Sh.I	<b>Aug. 26</b>	8:25	I.Tr.I		4:57	III.Tr.I
	7:17	II.Ec.R		21:43	I.Tr.E		8:26	I.Sh.I		8:23	III.Sh.E
<b>Aug. 21</b>	0:54	I.Tr.I		21:47	I.Sh.E		10:44	I.Tr.E		8:33	III.Tr.E
	1:00	I.Sh.I	<b>Aug. 23</b>	16:39	I.Oc.D		10:44	I.Sh.E		21:23	I.Sh.I
	3:12	I.Tr.E		17:35	II.Oc.D	<b>Aug. 27</b>	5:39	I.Ec.D		21:24	IV.Sh.I
	3:18	I.Sh.E		18:59	I.Ec.R		6:59	II.Ec.D		21:26	I.Tr.I
	10:28	IV.Oc.D		20:36	II.Ec.R		7:57	I.Oc.R		21:47	IV.Tr.I
	15:50	IV.Ec.R	<b>Aug. 24</b>	13:55	I.Tr.I		9:55	II.Oc.R		23:41	I.Sh.E
	22:09	I.Oc.D		13:57	I.Sh.I	<b>Aug. 28</b>	2:55	I.Sh.I		23:44	I.Tr.E
	22:49	II.Tr.I		16:13	I.Tr.E		2:56	I.Tr.I	<b>Aug. 30</b>	1:43	IV.Sh.E
	22:59	II.Sh.I		16:15	I.Sh.E		5:13	I.Sh.E		2:17	IV.Tr.E
<b>Aug. 22</b>	0:29	III.Tr.I	<b>Aug. 25</b>	11:09	I.Oc.D		5:14	I.Tr.E		18:36	I.Ec.D
	0:31	I.Ec.R		12:13	II.Tr.I	<b>Aug. 29</b>	0:07	I.Ec.D		20:18	II.Ec.D
	0:50	III.Sh.I		12:16	II.Sh.I		1:33	II.Sh.I		20:57	I.Oc.R
	1:41	II.Tr.E		13:28	I.Ec.R		1:37	II.Tr.I		23:21	II.Oc.R
	1:50	II.Sh.E		14:45	III.Oc.D		2:27	I.Oc.R	<b>Aug. 31</b>	15:52	I.Sh.I
	4:07	III.Tr.E		15:05	II.Tr.E		4:24	II.Sh.E		15:56	I.Tr.I
	4:25	III.Sh.E		15:07	II.Sh.E		4:29	II.Tr.E		18:10	I.Sh.E
	19:24	I.Tr.I		18:26	III.Ec.R		4:48	III.Sh.I		18:15	I.Tr.E

## Phenomena of Jupiter's Moons, September 2015

For telescopic observers, here is the complete list of phenomena involving Jupiter's four bright moons and the planet's disk or shadow. The first columns give the date and midpoint time of the event in Universal Time. Next is the satellite involved: I for Io, II Europa, III Ganymede, or IV Callisto. This is followed by the type of event: Oc for an occultation of the satellite behind Jupiter's limb, Ec for an eclipse by Jupiter's shadow, Tr for a transit of the satellite across the planet's face, or Sh for the satellite casting its tiny black shadow onto Jupiter. An occultation or eclipse begins when the satellite disappears (D) and ends when it reappears (R). A transit or shadow passage begins at ingress (I) and ends at egress (E). Each event is gradual, lasting several minutes. These predictions are courtesy IMCCE / Paris Observatory.

<b>Sept. 1</b>	13:04	I.Ec.D		13:00	III.Tr.E		12:13	II.Ec.D		16:52	I.Ec.D
	14:50	II.Sh.I		23:17	I.Sh.I		15:37	II.Oc.R		18:24	IV.Tr.I
	15:01	II.Tr.I		23:27	I.Tr.I	<b>Sept. 11</b>	6:43	I.Sh.I		19:28	I.Oc.R
	15:27	I.Oc.R	<b>Sept. 6</b>	1:35	I.Sh.E		6:58	I.Tr.I		19:38	IV.Sh.E
	17:41	II.Sh.E		1:46	I.Tr.E		9:01	I.Sh.E		19:58	II.Sh.I
	17:53	II.Tr.E		20:30	I.Ec.D		9:16	I.Tr.E		20:36	II.Tr.I
	18:50	III.Ec.D		22:55	II.Ec.D	<b>Sept. 12</b>	3:55	I.Ec.D		22:44	IV.Tr.E
	22:50	III.Oc.R		22:58	I.Oc.R		6:28	I.Oc.R		22:48	II.Sh.E
<b>Sept. 2</b>	10:20	I.Sh.I	<b>Sept. 7</b>	2:12	II.Oc.R		6:41	II.Sh.I		23:27	II.Tr.E
	10:27	I.Tr.I		5:27	IV.Ec.D		7:12	II.Tr.I	<b>Sept. 16</b>	2:46	III.Ec.D
	12:38	I.Sh.E		11:41	IV.Oc.R		9:31	II.Sh.E		7:42	III.Oc.R
	12:45	I.Tr.E		17:46	I.Sh.I		10:04	II.Tr.E		14:09	I.Sh.I
<b>Sept. 3</b>	7:33	I.Ec.D		17:58	I.Tr.I		12:46	III.Sh.I		14:29	I.Tr.I
	9:36	II.Ec.D		20:04	I.Sh.E		13:51	III.Tr.I		16:27	I.Sh.E
	9:57	I.Oc.R		20:16	I.Tr.E		16:19	III.Sh.E		16:47	I.Tr.E
	12:46	II.Oc.R	<b>Sept. 8</b>	14:58	I.Ec.D		17:26	III.Tr.E	<b>Sept. 17</b>	11:20	I.Ec.D
<b>Sept. 4</b>	4:49	I.Sh.I		17:24	II.Sh.I	<b>Sept. 13</b>	1:12	I.Sh.I		13:58	I.Oc.R
	4:57	I.Tr.I		17:28	I.Oc.R		1:29	I.Tr.I		14:49	II.Ec.D
	7:07	I.Sh.E		17:49	II.Tr.I		3:30	I.Sh.E		18:27	II.Oc.R
	7:15	I.Tr.E		20:15	II.Sh.E		3:47	I.Tr.E	<b>Sept. 18</b>	8:38	I.Sh.I
<b>Sept. 5</b>	2:01	I.Ec.D		20:40	II.Tr.E		22:23	I.Ec.D		9:00	I.Tr.I
	4:07	II.Sh.I		22:48	III.Ec.D	<b>Sept. 14</b>	0:58	I.Oc.R		10:55	I.Sh.E
	4:25	II.Tr.I	<b>Sept. 9</b>	3:17	III.Oc.R		1:32	II.Ec.D		11:17	I.Tr.E
	4:28	I.Oc.R		12:15	I.Sh.I		5:03	II.Oc.R	<b>Sept. 19</b>	5:48	I.Ec.D
	6:58	II.Sh.E		12:28	I.Tr.I		19:40	I.Sh.I		8:28	I.Oc.R
	7:16	II.Tr.E		14:32	I.Sh.E		19:59	I.Tr.I		9:14	II.Sh.I
	8:47	III.Sh.I		14:46	I.Tr.E		21:58	I.Sh.E		10:00	II.Tr.I
	9:24	III.Tr.I	<b>Sept. 10</b>	9:26	I.Ec.D		22:17	I.Tr.E		12:05	II.Sh.E
	12:20	III.Sh.E		11:58	I.Oc.R	<b>Sept. 15</b>	15:24	IV.Sh.I		12:51	II.Tr.E

16:44	III.Sh.I		23:23	II.Tr.I		12:49	I.Sh.E		10:42	II.Oc.R
18:18	III.Tr.I	<b>Sept. 23</b>	1:22	II.Sh.E		13:18	I.Tr.E		23:29	I.Sh.I
20:17	III.Sh.E		2:14	II.Tr.E	<b>Sept. 26</b>	7:42	I.Ec.D	<b>Sept. 29</b>	0:01	I.Tr.I
21:52	III.Tr.E		6:44	III.Ec.D		10:28	I.Oc.R		1:46	I.Sh.E
<b>Sept. 20</b>	3:06	I.Sh.I	12:07	III.Oc.R		11:48	II.Sh.I		2:18	I.Tr.E
	3:30	I.Tr.I	16:03	I.Sh.I		12:47	II.Tr.I		20:39	I.Ec.D
	5:24	I.Sh.E	16:30	I.Tr.I		14:39	II.Sh.E		23:28	I.Oc.R
	5:47	I.Tr.E	18:21	I.Sh.E		15:37	II.Tr.E	<b>Sept. 30</b>	1:05	II.Sh.I
<b>Sept. 21</b>	0:17	I.Ec.D	18:48	I.Tr.E		20:43	III.Sh.I		2:10	II.Tr.I
	2:58	I.Oc.R	23:29	IV.Ec.D		22:45	III.Tr.I		3:56	II.Sh.E
	4:08	II.Ec.D	<b>Sept. 24</b>	3:44	IV.Ec.R	<b>Sept. 27</b>	0:16	III.Sh.E	5:01	II.Tr.E
	7:53	II.Oc.R		3:52	IV.Oc.D		2:17	III.Tr.E	10:41	III.Ec.D
	21:35	I.Sh.I		8:11	IV.Oc.R		5:00	I.Sh.I	16:31	III.Oc.R
	22:00	I.Tr.I		13:13	I.Ec.D		5:30	I.Tr.I	17:57	I.Sh.I
	23:52	I.Sh.E		15:58	I.Oc.R		7:18	I.Sh.E	18:31	I.Tr.I
<b>Sept. 22</b>	0:18	I.Tr.E		17:26	II.Ec.D		7:48	I.Tr.E	20:15	I.Sh.E
	18:45	I.Ec.D		21:17	II.Oc.R	<b>Sept. 28</b>	2:10	I.Ec.D	20:48	I.Tr.E
	21:28	I.Oc.R	<b>Sept. 25</b>	10:32	I.Sh.I		4:58	I.Oc.R		
	22:31	II.Sh.I		11:00	I.Tr.I		6:44	II.Ec.D		

## Phenomena of Jupiter's Moons, October 2015

For telescopic observers, here is the complete list of phenomena involving Jupiter's four bright moons and the planet's disk or shadow. The first columns give the date and midpoint time of the event in Universal Time. Next is the satellite involved: I for Io, II Europa, III Ganymede, or IV Callisto. This is followed by the type of event: Oc for an occultation of the satellite behind Jupiter's limb, Ec for an eclipse by Jupiter's shadow, Tr for a transit of the satellite across the planet's face, or Sh for the satellite casting its tiny black shadow onto Jupiter. An occultation or eclipse begins when the satellite disappears (D) and ends when it reappears (R). A transit or shadow passage begins at ingress (I) and ends at egress (E). Each event is gradual, lasting several minutes. These predictions are courtesy IMCCE / Paris Observatory.

<b>Oct. 1</b>	15:07	I.Ec.D		13:31	II.Oc.R		18:20	II.Tr.I		21:45	I.Sh.I
	17:58	I.Oc.R	<b>Oct. 6</b>	1:23	I.Sh.I		19:46	II.Sh.E		22:31	I.Tr.I
	20:02	II.Ec.D		2:01	I.Tr.I		21:10	II.Tr.E	<b>Oct. 15</b>	0:02	I.Sh.E
<b>Oct. 2</b>	0:06	II.Oc.R		3:40	I.Sh.E		21:40	IV.Ec.R		0:48	I.Tr.E
	9:23	IV.Sh.I		4:18	I.Tr.E	<b>Oct. 11</b>	0:22	IV.Oc.D		1:16	III.Oc.R
	12:26	I.Sh.I		22:32	I.Ec.D		4:27	IV.Oc.R		18:54	I.Ec.D
	13:01	I.Tr.I	<b>Oct. 7</b>	1:28	I.Oc.R		4:40	III.Sh.I		21:57	I.Oc.R
	13:32	IV.Sh.E		3:39	II.Sh.I		7:33	III.Tr.I	<b>Oct. 16</b>	1:14	II.Ec.D
	14:43	I.Sh.E		4:57	II.Tr.I		8:11	III.Sh.E		5:41	II.Oc.R
	14:53	IV.Tr.I		6:29	II.Sh.E		8:48	I.Sh.I		16:14	I.Sh.I
	15:18	I.Tr.E		7:47	II.Tr.E		9:31	I.Tr.I		17:01	I.Tr.I
	19:01	IV.Tr.E		14:40	III.Ec.D		11:03	III.Tr.E		18:31	I.Sh.E
<b>Oct. 3</b>	9:35	I.Ec.D		19:51	I.Sh.I		11:05	I.Sh.E		19:18	I.Tr.E
	12:28	I.Oc.R		20:31	I.Tr.I		11:48	I.Tr.E	<b>Oct. 17</b>	13:22	I.Ec.D
	14:22	II.Sh.I		20:54	III.Oc.R	<b>Oct. 12</b>	5:57	I.Ec.D		16:27	I.Oc.R
	15:33	II.Tr.I		22:08	I.Sh.E		8:58	I.Oc.R		19:30	II.Sh.I
	17:12	II.Sh.E		22:48	I.Tr.E		11:56	II.Ec.D		21:05	II.Tr.I
	18:24	II.Tr.E	<b>Oct. 8</b>	17:00	I.Ec.D		16:18	II.Oc.R		22:20	II.Sh.E
<b>Oct. 4</b>	0:42	III.Sh.I		19:58	I.Oc.R	<b>Oct. 13</b>	3:17	I.Sh.I		23:55	II.Tr.E
	3:09	III.Tr.I		22:38	II.Ec.D		4:01	I.Tr.I	<b>Oct. 18</b>	8:37	III.Sh.I
	4:13	III.Sh.E	<b>Oct. 9</b>	2:54	II.Oc.R		5:34	I.Sh.E		10:42	I.Sh.I
	6:41	III.Tr.E		14:20	I.Sh.I		6:18	I.Tr.E		11:31	I.Tr.I
	6:54	I.Sh.I		15:01	I.Tr.I	<b>Oct. 14</b>	0:25	I.Ec.D		11:54	III.Tr.I
	7:31	I.Tr.I		16:37	I.Sh.E		3:27	I.Oc.R		12:08	III.Sh.E
	9:12	I.Sh.E		17:18	I.Tr.E		6:13	II.Sh.I		12:59	I.Sh.E
	9:48	I.Tr.E	<b>Oct. 10</b>	11:29	I.Ec.D		7:43	II.Tr.I		13:47	I.Tr.E
<b>Oct. 5</b>	4:04	I.Ec.D		14:28	I.Oc.R		9:03	II.Sh.E		15:23	III.Tr.E
	6:58	I.Oc.R		16:56	II.Sh.I		10:32	II.Tr.E	<b>Oct. 19</b>	3:22	IV.Sh.I
	9:20	II.Ec.D		17:30	IV.Ec.D		18:38	III.Ec.D		7:25	IV.Sh.E

	7:50	I.Ec.D		2:47	I.Tr.E		15:46	I.Tr.E		14:10	II.Sh.E
	10:57	I.Oc.R		5:37	III.Oc.R		16:05	III.Sh.E		16:01	II.Tr.E
	11:08	IV.Tr.I		20:47	I.Ec.D		16:14	III.Tr.I	<b>Oct. 29</b>	1:33	I.Sh.I
	14:32	II.Ec.D		23:56	I.Oc.R		19:41	III.Tr.E		2:29	I.Tr.I
	15:02	IV.Tr.E	<b>Oct. 23</b>	3:49	II.Ec.D	<b>Oct. 26</b>	9:44	I.Ec.D		2:34	III.Ec.D
	19:05	II.Oc.R		8:28	II.Oc.R		12:55	I.Oc.R		3:49	I.Sh.E
<b>Oct. 20</b>	5:11	I.Sh.I		18:07	I.Sh.I		17:07	II.Ec.D		4:45	I.Tr.E
	6:00	I.Tr.I		19:00	I.Tr.I		21:50	II.Oc.R		6:06	III.Ec.R
	7:27	I.Sh.E		20:24	I.Sh.E	<b>Oct. 27</b>	7:04	I.Sh.I		6:26	III.Oc.D
	8:17	I.Tr.E		21:16	I.Tr.E		7:59	I.Tr.I		9:54	III.Oc.R
<b>Oct. 21</b>	2:19	I.Ec.D	<b>Oct. 24</b>	15:15	I.Ec.D		9:21	I.Sh.E		22:40	I.Ec.D
	5:26	I.Oc.R		18:25	I.Oc.R		10:16	I.Tr.E	<b>Oct. 30</b>	1:54	I.Oc.R
	8:47	II.Sh.I		22:04	II.Sh.I		11:30	IV.Ec.D		6:25	II.Ec.D
	10:28	II.Tr.I		23:50	II.Tr.I		15:35	IV.Ec.R		11:13	II.Oc.R
	11:37	II.Sh.E	<b>Oct. 25</b>	0:54	II.Sh.E		20:33	IV.Oc.D		20:01	I.Sh.I
	13:17	II.Tr.E		2:39	II.Tr.E	<b>Oct. 28</b>	0:22	IV.Oc.R		20:59	I.Tr.I
	22:36	III.Ec.D		12:35	III.Sh.I		4:12	I.Ec.D		22:18	I.Sh.E
	23:39	I.Sh.I		12:36	I.Sh.I		7:25	I.Oc.R		23:15	I.Tr.E
<b>Oct. 22</b>	0:30	I.Tr.I		13:30	I.Tr.I		11:21	II.Sh.I	<b>Oct. 31</b>	17:08	I.Ec.D
	1:56	I.Sh.E		14:53	I.Sh.E		13:12	II.Tr.I		20:24	I.Oc.R

## Phenomena of Jupiter's Moons, November 2015

For telescopic observers, here is the complete list of phenomena involving Jupiter's four bright moons and the planet's disk or shadow. The first columns give the date and midpoint time of the event in Universal Time. Next is the satellite involved: I for Io, II Europa, III Ganymede, or IV Callisto. This is followed by the type of event: Oc for an occultation of the satellite behind Jupiter's limb, Ec for an eclipse by Jupiter's shadow, Tr for a transit of the satellite across the planet's face, or Sh for the satellite casting its tiny black shadow onto Jupiter. An occultation or eclipse begins when the satellite disappears (D) and ends when it reappears (R). A transit or shadow passage begins at ingress (I) and ends at egress (E). Each event is gradual, lasting several minutes. These predictions are courtesy IMCCE / Paris Observatory.

<b>Nov. 1</b>	0:38	II.Sh.I		4:27	I.Tr.I		0:49	III.Tr.I		16:19	IV.Oc.D
	2:34	II.Tr.I		5:43	I.Sh.E		4:12	III.Tr.E		16:38	II.Oc.R
	3:27	II.Sh.E		6:31	III.Ec.D		13:30	I.Ec.D		19:48	IV.Oc.R
	5:23	II.Tr.E		6:43	I.Tr.E		16:51	I.Oc.R		23:48	I.Sh.I
	14:29	I.Sh.I		7:02	IV.Tr.I		22:18	II.Ec.D	<b>Nov. 14</b>	0:54	I.Tr.I
	15:28	I.Tr.I		10:03	III.Ec.R	<b>Nov. 10</b>	3:18	II.Oc.R		2:04	I.Sh.E
	16:34	III.Sh.I		10:38	IV.Tr.E		10:51	I.Sh.I		3:09	I.Tr.E
	16:46	I.Sh.E		10:43	III.Oc.D		11:55	I.Tr.I		20:55	I.Ec.D
	17:44	I.Tr.E		14:10	III.Oc.R		13:08	I.Sh.E	<b>Nov. 15</b>	0:18	I.Oc.R
	20:03	III.Sh.E	<b>Nov. 6</b>	0:33	I.Ec.D		14:11	I.Tr.E		5:46	II.Sh.I
	20:33	III.Tr.I		3:52	I.Oc.R	<b>Nov. 11</b>	7:58	I.Ec.D		7:59	II.Tr.I
	23:58	III.Tr.E		9:00	II.Ec.D		11:20	I.Oc.R		8:35	II.Sh.E
<b>Nov. 2</b>	11:37	I.Ec.D		13:56	II.Oc.R		16:29	II.Sh.I		10:47	II.Tr.E
	14:53	I.Oc.R		21:55	I.Sh.I		18:38	II.Tr.I		18:17	I.Sh.I
	19:43	II.Ec.D		22:57	I.Tr.I		19:18	II.Sh.E		19:23	I.Tr.I
<b>Nov. 3</b>	0:35	II.Oc.R	<b>Nov. 7</b>	0:11	I.Sh.E		21:26	II.Tr.E		20:33	I.Sh.E
	8:58	I.Sh.I		1:12	I.Tr.E	<b>Nov. 12</b>	5:20	I.Sh.I		21:38	I.Tr.E
	9:58	I.Tr.I		19:02	I.Ec.D		6:25	I.Tr.I	<b>Nov. 16</b>	0:30	III.Sh.I
	11:14	I.Sh.E		22:21	I.Oc.R		7:36	I.Sh.E		3:58	III.Sh.E
	12:14	I.Tr.E	<b>Nov. 8</b>	3:12	II.Sh.I		8:40	I.Tr.E		5:03	III.Tr.I
<b>Nov. 4</b>	6:05	I.Ec.D		5:17	II.Tr.I		10:29	III.Ec.D		8:24	III.Tr.E
	9:22	I.Oc.R		6:01	II.Sh.E		13:59	III.Ec.R		15:23	I.Ec.D
	13:55	II.Sh.I		8:05	II.Tr.E		14:58	III.Oc.D		18:47	I.Oc.R
	15:56	II.Tr.I		16:23	I.Sh.I		18:22	III.Oc.R	<b>Nov. 17</b>	0:53	II.Ec.D
	16:44	II.Sh.E		17:26	I.Tr.I	<b>Nov. 13</b>	2:27	I.Ec.D		5:59	II.Oc.R
	18:44	II.Tr.E		18:39	I.Sh.E		5:31	IV.Ec.D		12:45	I.Sh.I
	21:21	IV.Sh.I		19:42	I.Tr.E		5:49	I.Oc.R		13:52	I.Tr.I
<b>Nov. 5</b>	1:18	IV.Sh.E		20:32	III.Sh.I		9:30	IV.Ec.R		15:01	I.Sh.E
	3:26	I.Sh.I	<b>Nov. 9</b>	0:00	III.Sh.E		11:35	II.Ec.D		16:07	I.Tr.E

<b>Nov. 18</b>	9:51	I.Ec.D		19:09	IV.Sh.E		16:54	I.Sh.E		7:01	I.Tr.E
	13:16	I.Oc.R		22:48	I.Ec.D		18:03	I.Tr.E	<b>Nov. 29</b>	0:41	I.Ec.D
	19:03	II.Sh.I	<b>Nov. 22</b>	2:14	I.Oc.R	<b>Nov. 25</b>	11:45	I.Ec.D		4:10	I.Oc.R
	21:20	II.Tr.I		2:26	IV.Tr.I		15:12	I.Oc.R		10:55	II.Sh.I
	21:52	II.Sh.E		5:41	IV.Tr.E		21:37	II.Sh.I		13:20	II.Tr.I
<b>Nov. 19</b>	0:07	II.Tr.E		8:20	II.Sh.I	<b>Nov. 26</b>	0:00	II.Tr.I		13:44	II.Sh.E
	7:13	I.Sh.I		10:40	II.Tr.I		0:26	II.Sh.E		16:06	II.Tr.E
	8:21	I.Tr.I		11:09	II.Sh.E		2:46	II.Tr.E		22:03	I.Sh.I
	9:29	I.Sh.E		13:27	II.Tr.E		9:07	I.Sh.I		23:15	I.Tr.I
	10:36	I.Tr.E		20:10	I.Sh.I		10:17	I.Tr.I		23:31	IV.Ec.D
	14:26	III.Ec.D		21:19	I.Tr.I		11:22	I.Sh.E	<b>Nov. 30</b>	0:19	I.Sh.E
	17:56	III.Ec.R		22:26	I.Sh.E		12:32	I.Tr.E		1:30	I.Tr.E
	19:09	III.Oc.D		23:34	I.Tr.E		18:24	III.Ec.D		3:23	IV.Ec.R
	22:32	III.Oc.R	<b>Nov. 23</b>	4:28	III.Sh.I		21:54	III.Ec.R		8:25	III.Sh.I
<b>Nov. 20</b>	4:20	I.Ec.D		7:55	III.Sh.E		23:19	III.Oc.D		11:29	IV.Oc.D
	7:45	I.Oc.R		9:13	III.Tr.I	<b>Nov. 27</b>	2:40	III.Oc.R		11:52	III.Sh.E
	14:10	II.Ec.D		12:33	III.Tr.E		6:13	I.Ec.D		13:20	III.Tr.I
	19:19	II.Oc.R		17:16	I.Ec.D		9:41	I.Oc.R		14:36	IV.Oc.R
<b>Nov. 21</b>	1:42	I.Sh.I		20:43	I.Oc.R		16:44	II.Ec.D		16:38	III.Tr.E
	2:50	I.Tr.I	<b>Nov. 24</b>	3:27	II.Ec.D		21:58	II.Oc.R		19:09	I.Ec.D
	3:58	I.Sh.E		8:39	II.Oc.R	<b>Nov. 28</b>	3:35	I.Sh.I		22:39	I.Oc.R
	5:06	I.Tr.E		14:38	I.Sh.I		4:46	I.Tr.I			
	15:19	IV.Sh.I		15:48	I.Tr.I		5:51	I.Sh.E			

## Phenomena of Jupiter's Moons, December 2015

For telescopic observers, here is the complete list of phenomena involving Jupiter's four bright moons and the planet's disk or shadow. The first columns give the date and midpoint time of the event in Universal Time. Next is the satellite involved: I for Io, II Europa, III Ganymede, or IV Callisto. This is followed by the type of event: Oc for an occultation of the satellite behind Jupiter's limb, Ec for an eclipse by Jupiter's shadow, Tr for a transit of the satellite across the planet's face, or Sh for the satellite casting its tiny black shadow onto Jupiter. An occultation or eclipse begins when the satellite disappears (D) and ends when it reappears (R). A transit or shadow passage begins at ingress (I) and ends at egress (E). Each event is gradual, lasting several minutes. These predictions are courtesy IMCCE / Paris Observatory.

<b>Dec. 1</b>	6:02	II.Ec.D		6:05	I.Oc.R		5:35	II.Sh.E		19:45	III.Sh.E
	11:16	II.Oc.R		13:29	II.Sh.I		8:01	II.Tr.E		21:22	III.Tr.I
	16:32	I.Sh.I		15:57	II.Tr.I		12:53	I.Sh.I		22:56	I.Ec.D
	17:44	I.Tr.I		16:18	II.Sh.E		14:06	I.Tr.I	<b>Dec. 15</b>	0:36	III.Tr.E
	18:47	I.Sh.E		18:43	II.Tr.E		15:09	I.Sh.E		2:27	I.Oc.R
	19:58	I.Tr.E		23:57	I.Sh.I		16:21	I.Tr.E		11:10	II.Ec.D
<b>Dec. 2</b>	13:38	I.Ec.D	<b>Dec. 7</b>	1:09	I.Tr.I	<b>Dec. 11</b>	2:20	III.Ec.D		16:26	II.Oc.R
	17:07	I.Oc.R		2:12	I.Sh.E		5:49	III.Ec.R		20:18	I.Sh.I
<b>Dec. 3</b>	0:12	II.Sh.I		3:24	I.Tr.E		7:27	III.Oc.D		21:31	I.Tr.I
	2:38	II.Tr.I		12:22	III.Sh.I		9:59	I.Ec.D		22:33	I.Sh.E
	3:01	II.Sh.E		15:48	III.Sh.E		10:45	III.Oc.R		23:45	I.Tr.E
	5:24	II.Tr.E		17:23	III.Tr.I		13:30	I.Oc.R	<b>Dec. 16</b>	17:24	I.Ec.D
	11:00	I.Sh.I		20:39	III.Tr.E		21:53	II.Ec.D		17:31	IV.Ec.D
	12:12	I.Tr.I		21:03	I.Ec.D	<b>Dec. 12</b>	3:09	II.Oc.R		20:55	I.Oc.R
	13:16	I.Sh.E	<b>Dec. 8</b>	0:33	I.Oc.R		7:21	I.Sh.I		21:16	IV.Ec.R
	14:27	I.Tr.E		8:36	II.Ec.D		8:35	I.Tr.I	<b>Dec. 17</b>	5:21	II.Sh.I
	22:22	III.Ec.D		9:17	IV.Sh.I		9:37	I.Sh.E		5:53	IV.Oc.D
<b>Dec. 4</b>	1:51	III.Ec.R		13:01	IV.Sh.E		10:49	I.Tr.E		7:50	II.Tr.I
	3:24	III.Oc.D		13:52	II.Oc.R	<b>Dec. 13</b>	4:27	I.Ec.D		8:09	II.Sh.E
	6:44	III.Oc.R		18:25	I.Sh.I		7:58	I.Oc.R		8:36	IV.Oc.R
	8:06	I.Ec.D		19:38	I.Tr.I		16:03	II.Sh.I		10:35	II.Tr.E
	11:36	I.Oc.R		20:40	I.Sh.E		18:33	II.Tr.I		14:46	I.Sh.I
	19:19	II.Ec.D		21:10	IV.Tr.I		18:52	II.Sh.E		15:59	I.Tr.I
<b>Dec. 5</b>	0:34	II.Oc.R		21:52	I.Tr.E		21:19	II.Tr.E		17:02	I.Sh.E
	5:28	I.Sh.I	<b>Dec. 9</b>	0:03	IV.Tr.E	<b>Dec. 14</b>	1:50	I.Sh.I		18:14	I.Tr.E
	6:41	I.Tr.I		15:31	I.Ec.D		3:03	I.Tr.I	<b>Dec. 18</b>	6:18	III.Ec.D
	7:44	I.Sh.E		19:02	I.Oc.R		4:05	I.Sh.E		9:46	III.Ec.R
	8:55	I.Tr.E	<b>Dec. 10</b>	2:46	II.Sh.I		5:17	I.Tr.E		11:24	III.Oc.D
<b>Dec. 6</b>	2:34	I.Ec.D		5:15	II.Tr.I		16:19	III.Sh.I		11:52	I.Ec.D

	14:40	III.Oc.R		4:19	I.Oc.R		13:46	I.Ec.D	<b>Dec. 29</b>	0:15	III.Sh.I
	15:23	I.Oc.R		4:31	III.Tr.E		15:06	IV.Tr.I		2:42	I.Ec.D
<b>Dec. 19</b>	0:27	II.Ec.D		13:44	II.Ec.D		15:17	III.Oc.D		3:39	III.Sh.E
	5:42	II.Oc.R		18:58	II.Oc.R		17:15	I.Oc.R		5:09	III.Tr.I
	9:15	I.Sh.I		22:11	I.Sh.I		17:36	IV.Tr.E		6:11	I.Oc.R
	10:28	I.Tr.I		23:24	I.Tr.I		18:32	III.Oc.R		8:20	III.Tr.E
	11:30	I.Sh.E	<b>Dec. 23</b>	0:26	I.Sh.E	<b>Dec. 26</b>	3:01	II.Ec.D		16:18	II.Ec.D
	12:42	I.Tr.E		1:38	I.Tr.E		8:13	II.Oc.R		21:27	II.Oc.R
<b>Dec. 20</b>	6:21	I.Ec.D		19:17	I.Ec.D		11:08	I.Sh.I	<b>Dec. 30</b>	0:04	I.Sh.I
	9:51	I.Oc.R		22:47	I.Oc.R		12:19	I.Tr.I		1:15	I.Tr.I
	18:38	II.Sh.I	<b>Dec. 24</b>	7:55	II.Sh.I		13:23	I.Sh.E		2:19	I.Sh.E
	21:07	II.Tr.I		10:23	II.Tr.I		14:33	I.Tr.E		3:29	I.Tr.E
	21:27	II.Sh.E		10:44	II.Sh.E	<b>Dec. 27</b>	8:14	I.Ec.D		21:11	I.Ec.D
	23:52	II.Tr.E		13:08	II.Tr.E		11:43	I.Oc.R	<b>Dec. 31</b>	0:39	I.Oc.R
<b>Dec. 21</b>	3:43	I.Sh.I		16:39	I.Sh.I		21:13	II.Sh.I		10:30	II.Sh.I
	4:56	I.Tr.I		17:51	I.Tr.I		23:40	II.Tr.I		12:54	II.Tr.I
	5:58	I.Sh.E		18:55	I.Sh.E	<b>Dec. 28</b>	0:02	II.Sh.E		13:19	II.Sh.E
	7:10	I.Tr.E		20:05	I.Tr.E		2:24	II.Tr.E		15:39	II.Tr.E
	20:17	III.Sh.I	<b>Dec. 25</b>	3:15	IV.Sh.I		5:36	I.Sh.I		18:32	I.Sh.I
	23:42	III.Sh.E		6:52	IV.Sh.E		6:47	I.Tr.I		19:42	I.Tr.I
<b>Dec. 22</b>	0:49	I.Ec.D		10:15	III.Ec.D		7:51	I.Sh.E		20:48	I.Sh.E
	1:18	III.Tr.I		13:43	III.Ec.R		9:01	I.Tr.E		21:56	I.Tr.E