

Phenomena of Jupiter's Moons, January 2009

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.

Jan. 1	0:58	I.Tr.I.		16:36	I.Sh.E.		23:47	I.Tr.E.		7:18	I.Tr.E.
	1:22	I.Sh.I.	Jan. 5	11:12	I.Oc.D.	Jan. 10	0:02	I.Sh.E.		7:27	I.Sh.E.
	1:22	II.Tr.E.		13:50	I.Ec.R.		18:43	I.Oc.D.		7:29	II.Sh.E.
	2:13	II.Sh.E.	Jan. 6	3:30	III.Oc.D.		21:16	I.Ec.R.	Jan. 16	2:15	I.Oc.D.
	3:14	I.Tr.E.		6:49	II.Oc.D.	Jan. 11	12:03	IV.Oc.D.		4:42	I.Ec.R.
	3:39	I.Sh.E.		8:17	III.Ec.R.		14:50	II.Tr.I.		22:15	III.Tr.I.
	22:10	I.Oc.D.		8:29	I.Tr.I.		15:17	II.Sh.I.		22:45	III.Sh.I.
Jan. 2	0:52	I.Ec.R.		8:48	I.Sh.I.		16:00	I.Tr.I.		23:03	II.Oc.D.
	13:15	III.Tr.I.		10:15	II.Ec.R.		16:13	I.Sh.I.		23:31	I.Tr.I.
	14:46	III.Sh.I.		10:46	I.Tr.E.		17:42	II.Tr.E.		23:39	I.Sh.I.
	16:43	III.Tr.E.		11:04	I.Sh.E.		18:09	II.Sh.E.	Jan. 17	1:46	III.Tr.E.
	17:25	II.Oc.D.	Jan. 7	5:42	I.Oc.D.		18:17	I.Tr.E.		1:48	I.Tr.E.
	18:17	III.Sh.E.		8:18	I.Ec.R.		18:30	I.Sh.E.		1:56	I.Sh.E.
	19:28	I.Tr.I.	Jan. 8	1:24	II.Tr.I.		18:44	IV.Ec.R.		2:07	II.Ec.R.
	19:50	I.Sh.I.		1:59	II.Sh.I.	Jan. 12	13:14	I.Oc.D.		2:18	III.Sh.E.
	20:57	II.Ec.R.		2:59	I.Tr.I.		15:45	I.Ec.R.		20:46	I.Oc.D.
	21:45	I.Tr.E.		3:16	I.Sh.I.	Jan. 13	8:00	III.Oc.D.		23:11	I.Ec.R.
	22:07	I.Sh.E.		4:15	II.Tr.E.		9:39	II.Oc.D.	Jan. 18	17:44	II.Tr.I.
Jan. 3	0:02	IV.Tr.I.		4:51	II.Sh.E.		10:31	I.Tr.I.		17:55	II.Sh.I.
	3:30	IV.Sh.I.		5:16	I.Tr.E.		10:42	I.Sh.I.		18:02	I.Tr.I.
	4:30	IV.Tr.E.		5:33	I.Sh.E.		12:18	III.Ec.R.		18:08	I.Sh.I.
	8:06	IV.Sh.E.	Jan. 9	0:13	I.Oc.D.		12:47	I.Tr.E.		20:19	I.Tr.E.
	16:41	I.Oc.D.		2:47	I.Ec.R.		12:50	II.Ec.R.		20:25	I.Sh.E.
	19:21	I.Ec.R.		17:44	III.Tr.I.		12:59	I.Sh.E.		20:35	II.Tr.E.
Jan. 4	11:58	II.Tr.I.		18:45	III.Sh.I.	Jan. 14	7:45	I.Oc.D.		20:47	II.Sh.E.
	12:40	II.Sh.I.		20:14	II.Oc.D.		10:13	I.Ec.R.	Jan. 19	15:17	I.Oc.D.
	13:59	I.Tr.I.		21:14	III.Tr.E.	Jan. 15	4:17	II.Tr.I.		17:40	I.Ec.R.
	14:19	I.Sh.I.		21:30	I.Tr.I.		4:37	II.Sh.I.		20:56	IV.Tr.I.
	14:48	II.Tr.E.		21:45	I.Sh.I.		5:01	I.Tr.I.		21:38	IV.Sh.I.
	15:31	II.Sh.E.		22:17	III.Sh.E.		5:11	I.Sh.I.	Jan. 20	1:33	IV.Tr.E.
	16:15	I.Tr.E.		23:32	II.Ec.R.		7:09	II.Tr.E.		2:17	IV.Sh.E.

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

Phenomena of Jupiter's Moons, February 2009

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.

Feb. 1	0:42	I.Ec.D.		17:53	IV.Tr.I.		20:54	I.Tr.E.		2:08	I.Tr.I.			
	3:09	I.Oc.R.		20:28	IV.Sh.E.		23:45	II.Oc.R.		4:01	I.Sh.E.			
	21:56	I.Sh.I.		22:36	IV.Tr.E.	Feb. 11	0:45	III.Ec.D.		4:25	I.Tr.E.			
	22:05	I.Tr.I.	Feb. 6	8:08	I.Ec.D.			5:36	III.Oc.R.		4:25	II.Sh.I.		
	23:10	II.Sh.I.			10:41		I.Oc.R.		15:34	I.Ec.D.		5:15	II.Tr.I.	
	23:30	II.Tr.I.		Feb. 7	5:21		I.Sh.I.		18:12	I.Oc.R.		7:18	II.Sh.E.	
Feb. 2	0:13	I.Sh.E.					5:36	I.Tr.I.	Feb. 12	12:47	I.Sh.I.		8:07	II.Tr.E.
	0:22	I.Tr.E.					7:02	II.Ec.D.			13:07	I.Tr.I.		23:00
	2:03	II.Sh.E.				7:38	I.Sh.E.			15:04	I.Sh.E.	Feb. 17	1:44	I.Oc.R.
	2:22	II.Tr.E.			7:53	I.Tr.E.		15:07		II.Sh.I.			20:12	I.Sh.I.
	19:11	I.Ec.D.			10:21	II.Oc.R.		15:24		I.Tr.E.			20:38	I.Tr.I.
	21:40	I.Oc.R.		10:46	III.Sh.I.		15:49	II.Tr.I.			22:29		I.Sh.E.	
Feb. 3	16:24	I.Sh.I.		11:47	III.Tr.I.		17:59	II.Sh.E.		22:53	II.Ec.D.			
	16:35	I.Tr.I.		14:19	III.Sh.E.		18:41	II.Tr.E.		22:55	I.Tr.E.			
	17:44	II.Ec.D.		15:21	III.Tr.E.	Feb. 13	10:03	I.Ec.D.	Feb. 18	2:35	II.Oc.R.			
	18:41	I.Sh.E.	Feb. 8	2:37	I.Ec.D.			12:43		I.Oc.R.		4:45	III.Ec.D.	
	18:53	I.Tr.E.			5:11		I.Oc.R.	Feb. 14		2:19	IV.Ec.D.		10:07	III.Oc.R.
	20:45	III.Ec.D.			23:50		I.Sh.I.				7:15	I.Sh.I.		17:29
20:56	II.Oc.R.	Feb. 9		0:06	I.Tr.I.					7:37	I.Tr.I.		20:14	I.Oc.R.
Feb. 4	1:05			III.Oc.R.			1:48			II.Sh.I.		9:33	I.Sh.E.	Feb. 19
	13:40			I.Ec.D.		2:07	I.Sh.E.			9:36	II.Ec.D.		15:08	
	16:10		I.Oc.R.		2:22	II.Tr.I.			9:55	I.Tr.E.		16:58	I.Sh.E.	
	Feb. 5		10:53	I.Sh.I.		2:24	I.Tr.E.		10:32	IV.Oc.R.		17:25	I.Tr.E.	
			11:06	I.Tr.I.		4:40	II.Sh.E.		13:10	II.Oc.R.		17:45	II.Sh.I.	
		12:30	II.Sh.I.		5:15	II.Tr.E.		14:45	III.Sh.I.		18:41	II.Tr.I.		
12:56		II.Tr.I.		21:06	I.Ec.D.		16:16	III.Tr.I.		20:37	II.Sh.E.			
13:10		I.Sh.E.		23:42	I.Oc.R.		18:19	III.Sh.E.		21:34	II.Tr.E.			
13:23		I.Tr.E.	Feb. 10	18:18	I.Sh.I.		19:51	III.Tr.E.	Feb. 20	11:58	I.Ec.D.			
15:22	II.Sh.E.			18:37	I.Tr.I.	Feb. 15	4:32	I.Ec.D.			14:45	I.Oc.R.		
15:46	IV.Sh.I.			20:19	II.Ec.D.			7:13		I.Oc.R.	Feb. 21	9:09	I.Sh.I.	
15:49	II.Tr.E.			20:36	I.Sh.E.		Feb. 16	1:44		I.Sh.I.			9:38	I.Tr.I.

	11:26	I.Sh.E.		19:34	IV.Tr.E.	Feb. 25	0:23	I.Sh.E.		21:32	II.Tr.I.
	11:56	I.Tr.E.	Feb. 23	3:38	I.Sh.I.		0:56	I.Tr.E.		23:14	II.Sh.E.
	12:10	II.Ec.D.		4:09	I.Tr.I.		1:28	II.Ec.D.	Feb. 27	0:25	II.Tr.E.
	15:59	II.Oc.R.		5:55	I.Sh.E.		5:23	II.Oc.R.		13:52	I.Ec.D.
	18:44	III.Sh.I.		6:26	I.Tr.E.		8:45	III.Ec.D.		16:46	I.Oc.R.
	20:45	III.Tr.I.		7:03	II.Sh.I.		14:37	III.Oc.R.	Feb. 28	11:03	I.Sh.I.
	22:19	III.Sh.E.		8:06	II.Tr.I.		19:23	I.Ec.D.		11:39	I.Tr.I.
Feb. 22	0:20	III.Tr.E.		9:55	II.Sh.E.		22:16	I.Oc.R.		13:20	I.Sh.E.
	6:26	I.Ec.D.		10:59	II.Tr.E.	Feb. 26	16:35	I.Sh.I.		13:56	I.Tr.E.
	9:15	I.Oc.R.	Feb. 24	0:55	I.Ec.D.		17:09	I.Tr.I.		14:45	II.Ec.D.
	9:54	IV.Sh.I.		3:46	I.Oc.R.		18:52	I.Sh.E.		18:48	II.Oc.R.
	14:39	IV.Sh.E.		22:06	I.Sh.I.		19:26	I.Tr.E.		22:44	III.Sh.I.
	14:46	IV.Tr.I.		22:39	I.Tr.I.		20:22	II.Sh.I.			

Phenomena of Jupiter's Moons, March 2009

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.

Mar. 1	1:13	III.Tr.I.	Mar. 6	20:46	I.Sh.E.	Mar. 12	2:40	I.Tr.I.	Mar. 17	10:18	III.Sh.E.
	2:18	III.Sh.E.		21:27	I.Tr.E.		4:02	IV.Sh.I.		12:09	I.Ec.D.
	4:49	III.Tr.E.		22:59	II.Sh.I.		4:11	I.Sh.E.		13:43	III.Tr.E.
	8:21	I.Ec.D.		0:23	II.Tr.I.		4:57	I.Tr.E.		15:18	I.Oc.R.
Mar. 2	11:17	I.Oc.R.	Mar. 7	1:51	II.Sh.E.	Mar. 13	6:36	II.Ec.D.	Mar. 18	9:20	I.Sh.I.
	5:32	I.Sh.I.		3:16	II.Tr.E.		8:48	IV.Sh.E.		10:10	I.Tr.I.
	6:09	I.Tr.I.		15:46	I.Ec.D.		11:00	II.Oc.R.		11:36	I.Sh.E.
	7:49	I.Sh.E.		18:47	I.Oc.R.		11:26	IV.Tr.I.		12:27	I.Tr.E.
Mar. 3	8:27	I.Tr.E.	Mar. 8	12:57	I.Sh.I.	Mar. 14	16:17	IV.Tr.E.	Mar. 19	14:54	II.Sh.I.
	9:40	II.Sh.I.		13:40	I.Tr.I.		16:45	III.Ec.D.		16:37	II.Tr.I.
	10:57	II.Tr.I.		15:14	I.Sh.E.		23:12	I.Ec.D.		17:46	II.Sh.E.
	12:32	II.Sh.E.		15:57	I.Tr.E.		23:31	III.Oc.R.		19:30	II.Tr.E.
Mar. 4	13:50	II.Tr.E.	Mar. 9	17:19	II.Ec.D.	Mar. 15	2:18	I.Oc.R.	Mar. 20	6:38	I.Ec.D.
	20:25	IV.Ec.D.		21:36	II.Oc.R.		20:23	I.Sh.I.		9:48	I.Oc.R.
	1:10	IV.Ec.R.		2:44	III.Sh.I.		21:10	I.Tr.I.		3:48	I.Sh.I.
	2:29	IV.Oc.D.		5:40	III.Tr.I.		22:40	I.Sh.E.		4:40	I.Tr.I.
Mar. 5	2:49	I.Ec.D.	Mar. 10	6:19	III.Sh.E.	Mar. 16	23:27	I.Tr.E.	Mar. 21	6:05	I.Sh.E.
	5:47	I.Oc.R.		9:17	III.Tr.E.		1:36	II.Sh.I.		6:57	I.Tr.E.
	7:18	IV.Oc.R.		10:15	I.Ec.D.		3:13	II.Tr.I.		9:11	II.Ec.D.
	0:00	I.Sh.I.		13:18	I.Oc.R.		4:28	II.Sh.E.		13:47	II.Oc.R.
Mar. 6	0:39	I.Tr.I.	Mar. 11	7:26	I.Sh.I.	Mar. 17	6:06	II.Tr.E.	Mar. 22	20:44	III.Ec.D.
	2:17	I.Sh.E.		8:10	I.Tr.I.		17:41	I.Ec.D.		1:06	I.Ec.D.
	2:57	I.Tr.E.		9:43	I.Sh.E.		20:48	I.Oc.R.		3:56	III.Oc.R.
	4:02	II.Ec.D.		10:27	I.Tr.E.		14:51	I.Sh.I.		4:18	I.Oc.R.
Mar. 7	8:12	II.Oc.R.	Mar. 12	12:17	II.Sh.I.	Mar. 18	15:40	I.Tr.I.	Mar. 23	14:31	IV.Ec.D.
	12:45	III.Ec.D.		13:48	II.Tr.I.		17:08	I.Sh.E.		19:18	IV.Ec.R.
	19:05	III.Oc.R.		15:09	II.Sh.E.		17:57	I.Tr.E.		22:17	I.Sh.I.
	21:18	I.Ec.D.		16:40	II.Tr.E.		19:53	II.Ec.D.		22:56	IV.Oc.D.
Mar. 8	0:17	I.Oc.R.	Mar. 13	4:44	I.Ec.D.	Mar. 19	0:23	II.Oc.R.	Mar. 24	23:10	I.Tr.I.
	18:29	I.Sh.I.		7:48	I.Oc.R.		6:43	III.Sh.I.		0:33	I.Sh.E.
	19:10	I.Tr.I.		1:54	I.Sh.I.		10:05	III.Tr.I.		1:27	I.Tr.E.

	3:47	IV.Oc.R.		12:09	I.Tr.I.		8:19	III.Oc.R.		5:56	II.Oc.R.
	4:13	II.Sh.I.		13:30	I.Sh.E.	Mar. 27	0:10	I.Sh.I.		14:43	III.Sh.I.
	6:02	II.Tr.I.		14:26	I.Tr.E.		1:09	I.Tr.I.		15:57	I.Ec.D.
	7:04	II.Sh.E.		17:31	II.Sh.I.		2:27	I.Sh.E.		18:19	III.Sh.E.
	8:54	II.Tr.E.		19:25	II.Tr.I.		3:26	I.Tr.E.		18:52	III.Tr.I.
	19:35	I.Ec.D.		20:22	II.Sh.E.		6:49	II.Sh.I.		19:18	I.Oc.R.
	22:48	I.Oc.R.		22:18	II.Tr.E.		8:49	II.Tr.I.		22:29	III.Tr.E.
Mar. 21	16:45	I.Sh.I.	Mar. 24	8:32	I.Ec.D.		9:41	II.Sh.E.	Mar. 30	13:07	I.Sh.I.
	17:39	I.Tr.I.		11:48	I.Oc.R.		11:42	II.Tr.E.		14:08	I.Tr.I.
	19:02	I.Sh.E.	Mar. 25	5:42	I.Sh.I.		21:29	I.Ec.D.		15:24	I.Sh.E.
	19:56	I.Tr.E.		6:39	I.Tr.I.		22:10	IV.Sh.I.		16:25	I.Tr.E.
	22:28	II.Ec.D.		7:59	I.Sh.E.	Mar. 28	0:48	I.Oc.R.		20:07	II.Sh.I.
Mar. 22	3:10	II.Oc.R.		8:56	I.Tr.E.		2:57	IV.Sh.E.		22:13	II.Tr.I.
	10:44	III.Sh.I.		11:45	II.Ec.D.		7:47	IV.Tr.I.		22:59	II.Sh.E.
	14:03	I.Ec.D.		16:33	II.Oc.R.		12:39	IV.Tr.E.	Mar. 31	1:05	II.Tr.E.
	14:19	III.Sh.E.	Mar. 26	0:43	III.Ec.D.		18:39	I.Sh.I.		10:26	I.Ec.D.
	14:30	III.Tr.I.		3:00	I.Ec.D.		19:39	I.Tr.I.		13:48	I.Oc.R.
	17:18	I.Oc.R.		4:19	III.Ec.R.		20:55	I.Sh.E.			
	18:07	III.Tr.E.		4:40	III.Oc.D.		21:56	I.Tr.E.			
Mar. 23	11:13	I.Sh.I.		6:18	I.Oc.R.	Mar. 29	1:02	II.Ec.D.			

Phenomena of Jupiter's Moons, April 2009

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.

Apr. 1	7:36	I.Sh.I.		18:43	III.Sh.I.		6:14	I.Sh.E.		8:32	IV.Tr.E.
	8:38	I.Tr.I.		19:00	IV.Oc.D.		7:23	I.Tr.E.		14:14	I.Ec.D.
	9:52	I.Sh.E.		21:17	I.Oc.R.		12:02	II.Sh.I.		17:44	I.Oc.R.
	10:55	I.Tr.E.		22:18	III.Sh.E.		14:21	II.Tr.I.	Apr. 15	11:23	I.Sh.I.
	14:20	II.Ec.D.		23:11	III.Tr.I.		14:53	II.Sh.E.		12:34	I.Tr.I.
	19:19	II.Oc.R.		23:51	IV.Oc.R.		17:13	II.Tr.E.		13:40	I.Sh.E.
Apr. 2	4:43	III.Ec.D.	Apr. 6	2:49	III.Tr.E.	Apr. 11	1:17	I.Ec.D.		14:51	I.Tr.E.
	4:54	I.Ec.D.		15:01	I.Sh.I.		4:45	I.Oc.R.		19:29	II.Ec.D.
	8:17	I.Oc.R.		16:07	I.Tr.I.		22:26	I.Sh.I.	Apr. 16	0:47	II.Oc.R.
	8:20	III.Ec.R.		17:18	I.Sh.E.		23:35	I.Tr.I.		8:42	I.Ec.D.
	9:02	III.Oc.D.		18:24	I.Tr.E.	Apr. 12	0:43	I.Sh.E.		12:14	I.Oc.R.
	12:41	III.Oc.R.		22:44	II.Sh.I.		1:52	I.Tr.E.		12:42	III.Ec.D.
Apr. 3	2:04	I.Sh.I.	Apr. 7	0:58	II.Tr.I.		6:12	II.Ec.D.		16:20	III.Ec.R.
	3:08	I.Tr.I.		1:35	II.Sh.E.		11:25	II.Oc.R.		17:36	III.Oc.D.
	4:21	I.Sh.E.		3:51	II.Tr.E.		19:45	I.Ec.D.		21:16	III.Oc.R.
	5:25	I.Tr.E.		12:20	I.Ec.D.		22:42	III.Sh.I.	Apr. 17	5:52	I.Sh.I.
	9:26	II.Sh.I.		15:46	I.Oc.R.		23:15	I.Oc.R.		7:04	I.Tr.I.
	11:36	II.Tr.I.	Apr. 8	9:29	I.Sh.I.	Apr. 13	2:17	III.Sh.E.		8:08	I.Sh.E.
	12:17	II.Sh.E.		10:36	I.Tr.I.		3:28	III.Tr.I.		9:20	I.Tr.E.
	14:28	II.Tr.E.		11:46	I.Sh.E.		7:05	III.Tr.E.		14:38	II.Sh.I.
	23:23	I.Ec.D.		12:53	I.Tr.E.		16:19	IV.Sh.I.		17:04	II.Tr.I.
Apr. 4	2:47	I.Oc.R.		16:54	II.Ec.D.		16:55	I.Sh.I.		17:29	II.Sh.E.
	20:33	I.Sh.I.		22:03	II.Oc.R.		18:05	I.Tr.I.		19:56	II.Tr.E.
	21:37	I.Tr.I.	Apr. 9	6:48	I.Ec.D.		19:11	I.Sh.E.	Apr. 18	3:11	I.Ec.D.
	22:49	I.Sh.E.		8:42	III.Ec.D.		20:22	I.Tr.E.		6:43	I.Oc.R.
	23:54	I.Tr.E.		10:16	I.Oc.R.		21:07	IV.Sh.E.	Apr. 19	0:20	I.Sh.I.
Apr. 5	3:37	II.Ec.D.		12:19	III.Ec.R.	Apr. 14	1:20	II.Sh.I.		1:33	I.Tr.I.
	8:37	IV.Ec.D.		13:20	III.Oc.D.		3:41	IV.Tr.I.		2:37	I.Sh.E.
	8:41	II.Oc.R.		16:59	III.Oc.R.		3:43	II.Tr.I.		3:50	I.Tr.E.
	13:25	IV.Ec.R.	Apr. 10	3:58	I.Sh.I.		4:11	II.Sh.E.		8:46	II.Ec.D.
	17:51	I.Ec.D.		5:06	I.Tr.I.		6:35	II.Tr.E.		14:08	II.Oc.R.

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

Phenomena of Jupiter's Moons, May 2009

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.

May 1	0:18	III.Ec.R.	May 6	11:46	II.Tr.I.	May 10	6:01	I.Sh.I.	May 16	8:17	III.Ec.R.				
	1:58	III.Oc.D.		11:58	II.Sh.E.		7:21	I.Tr.I.		10:07	III.Oc.D.				
	3:48	IV.Tr.E.		14:37	II.Tr.E.		8:18	I.Sh.E.		13:26	I.Sh.I.				
	5:38	III.Oc.R.		19:55	I.Ec.D.		9:37	I.Tr.E.		13:46	III.Oc.R.				
	9:39	I.Sh.I.		23:33	I.Oc.R.		16:31	II.Ec.D.		14:47	I.Tr.I.				
	10:57	I.Tr.I.		17:04	I.Sh.I.		22:08	II.Oc.R.		15:43	I.Sh.E.				
	11:56	I.Sh.E.		18:23	I.Tr.I.		3:21	I.Ec.D.		17:03	I.Tr.E.				
	13:13	I.Tr.E.		19:21	I.Sh.E.		6:59	I.Oc.R.		1:00	II.Sh.I.				
	19:49	II.Sh.I.		20:40	I.Tr.E.		14:41	III.Sh.I.		3:41	II.Tr.I.				
	22:26	II.Tr.I.		3:14	II.Ec.D.		18:17	III.Sh.E.		3:51	II.Sh.E.				
May 2	22:40	II.Sh.E.	May 7	8:49	II.Oc.R.	May 11	20:08	III.Tr.I.	May 17	6:32	II.Tr.E.				
	1:18	II.Tr.E.		14:24	I.Ec.D.		23:45	III.Tr.E.		10:46	I.Ec.D.				
	6:58	I.Ec.D.		18:02	I.Oc.R.		0:30	I.Sh.I.		14:25	I.Oc.R.				
	10:36	I.Oc.R.		0:40	III.Ec.D.		1:49	I.Tr.I.		4:35	IV.Sh.I.				
	May 3	4:07		I.Sh.I.	May 8		4:18	III.Ec.R.		May 12	2:46	I.Sh.E.	May 18	7:55	I.Sh.I.
		5:26		I.Tr.I.			6:04	III.Oc.D.			4:06	I.Tr.E.		9:15	I.Tr.I.
		6:24		I.Sh.E.			9:43	III.Oc.R.			11:42	II.Sh.I.		9:24	IV.Sh.E.
		7:42		I.Tr.E.			11:33	I.Sh.I.			14:23	II.Tr.I.		10:11	I.Sh.E.
		13:56		II.Ec.D.			12:52	I.Tr.I.			14:33	II.Sh.E.		11:32	I.Tr.E.
		19:29		II.Oc.R.			13:49	I.Sh.E.			17:14	II.Tr.E.		17:34	IV.Tr.I.
May 4		1:27	I.Ec.D.	May 9		15:09	I.Tr.E.	May 13	21:49		I.Ec.D.	May 19		19:07	II.Ec.D.
		5:05	I.Oc.R.			20:50	IV.Ec.D.		1:28		I.Oc.R.			22:19	IV.Tr.E.
		10:40	III.Sh.I.			22:25	II.Sh.I.		18:58		I.Sh.I.			0:44	II.Oc.R.
		14:16	III.Sh.E.			1:04	II.Tr.I.		20:18		I.Tr.I.			5:14	I.Ec.D.
	16:02	III.Tr.I.	1:15		II.Sh.E.	21:15	I.Sh.E.		8:53	I.Oc.R.					
	19:40	III.Tr.E.	1:40		IV.Ec.R.	22:35	I.Tr.E.		18:40	III.Sh.I.					
	22:36	I.Sh.I.	3:56		II.Tr.E.	5:49	II.Ec.D.		22:16	III.Sh.E.					
	23:54	I.Tr.I.	8:52		I.Ec.D.	11:26	II.Oc.R.		0:08	III.Tr.I.					
	May 5	0:52	I.Sh.E.		May 10	9:27	IV.Oc.D.		May 15	16:17	I.Ec.D.		May 20	2:23	I.Sh.I.
		2:11	I.Tr.E.			12:31	I.Oc.R.			19:57	I.Oc.R.			3:43	I.Tr.I.
9:07		II.Sh.I.	14:15	IV.Oc.R.		4:39	III.Ec.D.	3:45		III.Tr.E.					

	4:40	I.Sh.E.		17:37	I.Sh.E.		3:34	IV.Oc.D.		23:42	I.Oc.R.
	6:00	I.Tr.E.		17:45	III.Oc.R.		4:04	III.Tr.I.	May 29	12:38	III.Ec.D.
	14:17	II.Sh.I.		18:57	I.Tr.E.		4:17	I.Sh.I.		16:16	III.Ec.R.
	16:58	II.Tr.I.	May 23	3:35	II.Sh.I.		5:36	I.Tr.I.		17:14	I.Sh.I.
	17:08	II.Sh.E.		6:15	II.Tr.I.		6:34	I.Sh.E.		18:00	III.Oc.D.
	19:49	II.Tr.E.		6:25	II.Sh.E.		7:41	III.Tr.E.		18:33	I.Tr.I.
	23:43	I.Ec.D.		9:06	II.Tr.E.		7:53	I.Tr.E.		19:31	I.Sh.E.
May 20	3:22	I.Oc.R.		12:39	I.Ec.D.		8:18	IV.Oc.R.		20:49	I.Tr.E.
	20:52	I.Sh.I.		16:18	I.Oc.R.		16:52	II.Sh.I.		21:39	III.Oc.R.
	22:12	I.Tr.I.	May 24	9:49	I.Sh.I.		19:31	II.Tr.I.	May 30	6:10	II.Sh.I.
	23:08	I.Sh.E.		11:08	I.Tr.I.		19:43	II.Sh.E.		8:47	II.Tr.I.
May 21	0:28	I.Tr.E.		12:05	I.Sh.E.		22:22	II.Tr.E.		9:00	II.Sh.E.
	8:25	II.Ec.D.		13:25	I.Tr.E.	May 27	1:36	I.Ec.D.		11:38	II.Tr.E.
	14:02	II.Oc.R.		21:42	II.Ec.D.		5:14	I.Oc.R.		14:33	I.Ec.D.
	18:11	I.Ec.D.	May 25	3:19	II.Oc.R.		22:45	I.Sh.I.		18:10	I.Oc.R.
	21:50	I.Oc.R.		7:08	I.Ec.D.	May 28	0:05	I.Tr.I.	May 31	11:42	I.Sh.I.
May 22	8:38	III.Ec.D.		10:46	I.Oc.R.		1:02	I.Sh.E.		13:01	I.Tr.I.
	12:17	III.Ec.R.		14:56	IV.Ec.D.		2:21	I.Tr.E.		13:59	I.Sh.E.
	14:06	III.Oc.D.		19:46	IV.Ec.R.		11:00	II.Ec.D.		15:17	I.Tr.E.
	15:20	I.Sh.I.		22:39	III.Sh.I.		16:36	II.Oc.R.			
	16:40	I.Tr.I.	May 26	2:16	III.Sh.E.		20:05	I.Ec.D.			

Phenomena of Jupiter's Moons, June 2009

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.

June 1	0:18	II.Ec.D.		19:08	I.Sh.I.		0:52	II.Sh.E.		16:42	I.Tr.I.
	5:52	II.Oc.R.		20:17	III.Ec.R.		3:21	II.Tr.E.		17:47	I.Sh.E.
	9:01	I.Ec.D.		20:24	I.Tr.I.		5:24	I.Ec.D.		18:59	I.Tr.E.
	12:38	I.Oc.R.		21:25	I.Sh.E.		8:56	I.Oc.R.	June 15	5:30	II.Ec.D.
June 2	2:38	III.Sh.I.		21:51	III.Oc.D.	June 11	2:33	I.Sh.I.		10:51	II.Oc.R.
	6:11	I.Sh.I.		22:41	I.Tr.E.		3:47	I.Tr.I.		12:49	I.Ec.D.
	6:15	III.Sh.E.	June 6	1:29	III.Oc.R.		4:50	I.Sh.E.		16:18	I.Oc.R.
	7:29	I.Tr.I.		8:44	II.Sh.I.		6:04	I.Tr.E.	June 16	9:58	I.Sh.I.
	7:56	III.Tr.I.		11:16	II.Tr.I.		9:03	IV.Ec.D.		10:38	III.Sh.I.
	8:28	I.Sh.E.		11:35	II.Sh.E.		13:53	IV.Ec.R.		11:10	I.Tr.I.
	9:45	I.Tr.E.		14:07	II.Tr.E.		16:12	II.Ec.D.		12:15	I.Sh.E.
	11:33	III.Tr.E.		16:27	I.Ec.D.		20:46	IV.Oc.D.		13:27	I.Tr.E.
	19:27	II.Sh.I.		20:01	I.Oc.R.		21:38	II.Oc.R.		14:15	III.Sh.E.
	22:02	II.Tr.I.	June 7	13:36	I.Sh.I.		23:52	I.Ec.D.		15:28	III.Tr.I.
	22:18	II.Sh.E.		14:52	I.Tr.I.	June 12	1:27	IV.Oc.R.		19:05	III.Tr.E.
	22:44	IV.Sh.I.		15:53	I.Sh.E.		3:24	I.Oc.R.	June 17	0:36	II.Sh.I.
June 3	0:53	II.Tr.E.		17:09	I.Tr.E.		20:37	III.Ec.D.		2:57	II.Tr.I.
	3:30	I.Ec.D.	June 8	2:54	II.Ec.D.		21:01	I.Sh.I.		3:27	II.Sh.E.
	3:34	IV.Sh.E.		8:23	II.Oc.R.		22:15	I.Tr.I.		5:48	II.Tr.E.
	7:06	I.Oc.R.		10:55	I.Ec.D.		23:18	I.Sh.E.		7:17	I.Ec.D.
	11:16	IV.Tr.I.		14:29	I.Oc.R.	June 13	0:16	III.Ec.R.		10:46	I.Oc.R.
	15:58	IV.Tr.E.	June 9	6:38	III.Sh.I.		0:32	I.Tr.E.	June 18	4:27	I.Sh.I.
June 4	0:39	I.Sh.I.		8:05	I.Sh.I.		1:36	III.Oc.D.		5:37	I.Tr.I.
	1:56	I.Tr.I.		9:20	I.Tr.I.		5:14	III.Oc.R.		6:44	I.Sh.E.
	2:56	I.Sh.E.		10:15	III.Sh.E.		11:19	II.Sh.I.		7:54	I.Tr.E.
	4:13	I.Tr.E.		10:21	I.Sh.E.		13:44	II.Tr.I.		18:48	II.Ec.D.
	13:36	II.Ec.D.		11:36	I.Tr.E.		14:10	II.Sh.E.	June 19	0:05	II.Oc.R.
	19:08	II.Oc.R.		11:44	III.Tr.I.		16:35	II.Tr.E.		1:46	I.Ec.D.
	21:58	I.Ec.D.		15:21	III.Tr.E.		18:20	I.Ec.D.		5:13	I.Oc.R.
June 5	1:34	I.Oc.R.		22:02	II.Sh.I.		21:51	I.Oc.R.		16:53	IV.Sh.I.
	16:38	III.Ec.D.	June 10	0:30	II.Tr.I.	June 14	15:30	I.Sh.I.		21:43	IV.Sh.E.

	22:55	I.Sh.I.	June 22	8:06	II.Ec.D.		8:38	I.Sh.E.		3:11	IV.Ec.D.
June 20	0:04	I.Tr.I.		13:18	II.Oc.R.		9:43	I.Tr.E.		8:01	IV.Ec.R.
	0:36	III.Ec.D.		14:42	I.Ec.D.		21:24	II.Ec.D.		13:00	IV.Oc.D.
	1:13	I.Sh.E.		18:07	I.Oc.R.	June 26	2:30	II.Oc.R.		17:38	IV.Oc.R.
	2:21	I.Tr.E.	June 23	11:52	I.Sh.I.		3:39	I.Ec.D.		19:18	I.Sh.I.
	4:00	IV.Tr.I.		12:58	I.Tr.I.		7:01	I.Oc.R.		20:19	I.Tr.I.
	4:15	III.Ec.R.		14:10	I.Sh.E.	June 27	0:49	I.Sh.I.		21:35	I.Sh.E.
	5:16	III.Oc.D.		14:37	III.Sh.I.		1:53	I.Tr.I.		22:37	I.Tr.E.
	8:39	IV.Tr.E.		15:16	I.Tr.E.		3:07	I.Sh.E.	June 29	10:42	II.Ec.D.
	8:54	III.Oc.R.		18:15	III.Sh.E.		4:10	I.Tr.E.		15:42	II.Oc.R.
	13:53	II.Sh.I.		19:07	III.Tr.I.		4:35	III.Ec.D.		16:36	I.Ec.D.
	16:09	II.Tr.I.		22:43	III.Tr.E.		8:14	III.Ec.R.		19:55	I.Oc.R.
	16:44	II.Sh.E.	June 24	3:11	II.Sh.I.		8:52	III.Oc.D.	June 30	13:46	I.Sh.I.
	19:00	II.Tr.E.		5:20	II.Tr.I.		12:30	III.Oc.R.		14:46	I.Tr.I.
	20:14	I.Ec.D.		6:01	II.Sh.E.		16:28	II.Sh.I.		16:04	I.Sh.E.
	23:40	I.Oc.R.		8:11	II.Tr.E.		18:32	II.Tr.I.		17:04	I.Tr.E.
June 21	17:24	I.Sh.I.		9:11	I.Ec.D.		19:19	II.Sh.E.		18:38	III.Sh.I.
	18:31	I.Tr.I.		12:34	I.Oc.R.		21:23	II.Tr.E.		22:16	III.Sh.E.
	19:41	I.Sh.E.	June 25	6:21	I.Sh.I.		22:08	I.Ec.D.		22:41	III.Tr.I.
	20:48	I.Tr.E.		7:25	I.Tr.I.	June 28	1:28	I.Oc.R.			

Phenomena of Jupiter's Moons, July 2009

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.

July 1	2:18	III.Tr.E.		23:29	I.Sh.E.		10:34	I.Oc.R.		8:55	IV.Oc.R.
	5:45	II.Sh.I.	July 6	0:24	I.Tr.E.	July 11	4:37	I.Sh.I.		9:13	III.Tr.E.
	7:42	II.Tr.I.		11:02	IV.Sh.I.		5:26	I.Tr.I.		10:53	II.Sh.I.
	8:36	II.Sh.E.		13:19	II.Ec.D.		6:55	I.Sh.E.		12:19	II.Tr.I.
	10:33	II.Tr.E.		15:52	IV.Sh.E.		7:44	I.Tr.E.		13:45	II.Sh.E.
	11:05	I.Ec.D.		18:04	II.Oc.R.		12:35	III.Ec.D.		14:52	I.Ec.D.
	14:21	I.Oc.R.		18:30	I.Ec.D.		19:29	III.Oc.R.		15:11	II.Tr.E.
July 2	8:15	I.Sh.I.		19:44	IV.Tr.I.		21:36	II.Sh.I.		17:53	I.Oc.R.
	9:13	I.Tr.I.		21:41	I.Oc.R.		23:11	II.Tr.I.	July 16	12:03	I.Sh.I.
	10:32	I.Sh.E.	July 7	0:21	IV.Tr.E.	July 12	0:27	II.Sh.E.		12:45	I.Tr.I.
	11:30	I.Tr.E.		15:40	I.Sh.I.		1:55	I.Ec.D.		14:21	I.Sh.E.
July 3	0:01	II.Ec.D.		16:33	I.Tr.I.		2:02	II.Tr.E.		15:03	I.Tr.E.
	4:54	II.Oc.R.		17:58	I.Sh.E.		5:00	I.Oc.R.	July 17	5:14	II.Ec.D.
	5:33	I.Ec.D.		18:51	I.Tr.E.		23:06	I.Sh.I.		9:21	I.Ec.D.
	8:48	I.Oc.R.		22:37	III.Sh.I.		23:53	I.Tr.I.		9:34	II.Oc.R.
July 4	2:43	I.Sh.I.	July 8	2:11	III.Tr.I.	July 13	1:24	I.Sh.E.		12:19	I.Oc.R.
	3:40	I.Tr.I.		2:16	III.Sh.E.		2:10	I.Tr.E.	July 18	6:32	I.Sh.I.
	5:01	I.Sh.E.		5:48	III.Tr.E.		15:56	II.Ec.D.		7:12	I.Tr.I.
	5:57	I.Tr.E.		8:19	II.Sh.I.		20:24	I.Ec.D.		8:50	I.Sh.E.
	8:35	III.Ec.D.		10:02	II.Tr.I.		20:24	II.Oc.R.		9:30	I.Tr.E.
	12:14	III.Ec.R.		11:10	II.Sh.E.		23:27	I.Oc.R.		16:35	III.Ec.D.
	12:23	III.Oc.D.		12:53	II.Tr.E.	July 14	17:34	I.Sh.I.		22:52	III.Oc.R.
	16:01	III.Oc.R.		12:58	I.Ec.D.		18:19	I.Tr.I.	July 19	0:10	II.Sh.I.
	19:02	II.Sh.I.		16:08	I.Oc.R.		19:52	I.Sh.E.		1:27	II.Tr.I.
	20:52	II.Tr.I.	July 9	10:09	I.Sh.I.		20:37	I.Tr.E.		3:02	II.Sh.E.
	21:53	II.Sh.E.		11:00	I.Tr.I.		21:19	IV.Ec.D.		3:49	I.Ec.D.
	23:43	II.Tr.E.		12:27	I.Sh.E.	July 15	2:08	IV.Ec.R.		4:19	II.Tr.E.
July 5	0:01	I.Ec.D.		13:17	I.Tr.E.		2:37	III.Sh.I.		6:45	I.Oc.R.
	3:15	I.Oc.R.	July 10	2:38	II.Ec.D.		4:18	IV.Oc.D.	July 20	1:00	I.Sh.I.
	21:12	I.Sh.I.		7:15	II.Oc.R.		5:36	III.Tr.I.		1:38	I.Tr.I.
	22:07	I.Tr.I.		7:27	I.Ec.D.		6:16	III.Sh.E.		3:18	I.Sh.E.

	3:56	I.Tr.E.	July 23	5:13	IV.Sh.I.		3:43	II.Tr.I.		14:16	III.Sh.E.
	18:33	II.Ec.D.		10:03	IV.Sh.E.		5:36	II.Sh.E.		15:54	III.Tr.E.
	22:18	I.Ec.D.		10:36	IV.Tr.I.		5:43	I.Ec.D.		16:02	II.Sh.I.
	22:43	II.Oc.R.		13:57	I.Sh.I.		6:34	II.Tr.E.		16:50	II.Tr.I.
July 21	1:11	I.Oc.R.		14:30	I.Tr.I.		8:30	I.Oc.R.		18:40	I.Ec.D.
	19:29	I.Sh.I.		15:13	IV.Tr.E.	July 27	2:55	I.Sh.I.		18:54	II.Sh.E.
	20:04	I.Tr.I.		16:15	I.Sh.E.		3:23	I.Tr.I.		19:41	II.Tr.E.
	21:47	I.Sh.E.		16:48	I.Tr.E.		5:13	I.Sh.E.		21:21	I.Oc.R.
	22:22	I.Tr.E.	July 24	7:52	II.Ec.D.		5:41	I.Tr.E.	July 30	15:52	I.Sh.I.
July 22	6:37	III.Sh.I.		11:15	I.Ec.D.		21:10	II.Ec.D.		16:15	I.Tr.I.
	8:58	III.Tr.I.		11:52	II.Oc.R.	July 28	0:12	I.Ec.D.		18:10	I.Sh.E.
	10:16	III.Sh.E.		14:04	I.Oc.R.		1:00	II.Oc.R.		18:33	I.Tr.E.
	12:35	III.Tr.E.	July 25	8:26	I.Sh.I.		2:56	I.Oc.R.	July 31	10:29	II.Ec.D.
	13:28	II.Sh.I.		8:57	I.Tr.I.		21:23	I.Sh.I.		13:09	I.Ec.D.
	14:35	II.Tr.I.		10:44	I.Sh.E.		21:49	I.Tr.I.		14:08	II.Oc.R.
	16:19	II.Sh.E.		11:15	I.Tr.E.		23:42	I.Sh.E.		15:28	IV.Ec.D.
	16:46	I.Ec.D.		20:36	III.Ec.D.	July 29	0:07	I.Tr.E.		15:47	I.Oc.R.
	17:27	II.Tr.E.	July 26	2:13	III.Oc.R.		10:37	III.Sh.I.		23:28	IV.Oc.R.
	19:37	I.Oc.R.		2:45	II.Sh.I.		12:17	III.Tr.I.			

Phenomena of Jupiter's Moons, August 2009

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.

Aug. 1	10:21	I.Sh.I.		21:28	II.Sh.E.	Aug. 11	2:25	II.Ec.D.		10:23	II.Tr.I.
	10:41	I.Tr.I.		21:55	II.Tr.E.		4:00	I.Ec.D.		10:28	II.Sh.I.
	12:39	I.Sh.E.		23:05	I.Oc.R.		5:31	II.Oc.R.		11:23	I.Oc.D.
	12:59	I.Tr.E.	Aug. 6	17:47	I.Sh.I.		6:23	I.Oc.R.		12:14	III.Ec.R.
Aug. 2	0:36	III.Ec.D.		17:59	I.Tr.I.	Aug. 12	1:13	I.Sh.I.		13:15	II.Tr.E.
	5:19	II.Sh.I.		20:05	I.Sh.E.		1:17	I.Tr.I.		13:20	II.Sh.E.
	5:31	III.Oc.R.		20:17	I.Tr.E.		3:31	I.Sh.E.		13:43	I.Ec.R.
	5:57	II.Tr.I.	Aug. 7	13:06	II.Ec.D.		3:35	I.Tr.E.	Aug. 17	8:35	I.Tr.I.
	7:37	I.Ec.D.		15:03	I.Ec.D.		18:39	III.Sh.I.		8:39	I.Sh.I.
	8:11	II.Sh.E.		16:24	II.Oc.R.		18:51	III.Tr.I.		9:03	IV.Oc.D.
	8:48	II.Tr.E.		17:31	I.Oc.R.		21:11	II.Sh.I.		10:53	I.Tr.E.
	10:13	I.Oc.R.	Aug. 8	12:15	I.Sh.I.		21:16	II.Tr.I.		10:57	I.Sh.E.
Aug. 3	4:49	I.Sh.I.		12:25	I.Tr.I.		22:18	III.Sh.E.		14:25	IV.Ec.R.
	5:07	I.Tr.I.		14:34	I.Sh.E.		22:28	I.Ec.D.	Aug. 18	4:51	II.Oc.D.
	7:08	I.Sh.E.		14:43	I.Tr.E.		22:29	III.Tr.E.		5:49	I.Oc.D.
	7:25	I.Tr.E.		23:24	IV.Sh.I.	Aug. 13	0:03	II.Sh.E.		7:58	II.Ec.R.
	23:47	II.Ec.D.	Aug. 9	0:52	IV.Tr.I.		0:08	II.Tr.E.		8:12	I.Ec.R.
Aug. 4	2:06	I.Ec.D.		4:13	IV.Sh.E.		0:49	I.Oc.R.	Aug. 19	3:01	I.Tr.I.
	3:16	II.Oc.R.		4:35	III.Ec.D.		19:41	I.Sh.I.		3:08	I.Sh.I.
	4:39	I.Oc.R.		5:30	IV.Tr.E.		19:43	I.Tr.I.		5:19	I.Tr.E.
	23:18	I.Sh.I.		7:54	II.Sh.I.		22:00	I.Sh.E.		5:26	I.Sh.E.
	23:33	I.Tr.I.		8:10	II.Tr.I.		22:01	I.Tr.E.		22:08	III.Tr.I.
Aug. 5	1:36	I.Sh.E.		8:47	III.Oc.R.	Aug. 14	15:44	II.Ec.D.		22:40	III.Sh.I.
	1:51	I.Tr.E.		9:31	I.Ec.D.		16:57	I.Ec.D.		23:30	II.Tr.I.
	14:38	III.Sh.I.		10:46	II.Sh.E.		18:39	II.Ec.R.		23:46	II.Sh.I.
	15:35	III.Tr.I.		11:02	II.Tr.E.		19:15	I.Ec.R.	Aug. 20	0:15	I.Oc.D.
	18:17	III.Sh.E.		11:57	I.Oc.R.	Aug. 15	14:09	I.Tr.I.		1:45	III.Tr.E.
	18:36	II.Sh.I.	Aug. 10	6:44	I.Sh.I.		14:10	I.Sh.I.		2:20	III.Sh.E.
	19:03	II.Tr.I.		6:51	I.Tr.I.		16:27	I.Tr.E.		2:21	II.Tr.E.
	19:12	III.Tr.E.		9:02	I.Sh.E.		16:29	I.Sh.E.		2:38	II.Sh.E.
	20:34	I.Ec.D.		9:09	I.Tr.E.	Aug. 16	8:26	III.Oc.D.		2:40	I.Ec.R.

	21:27	I.Tr.I.		15:55	II.Sh.E.	Aug. 27	1:24	III.Tr.I.	Aug. 29	17:37	I.Tr.I.
	21:36	I.Sh.I.		16:15	III.Ec.R.		1:43	II.Tr.I.		18:01	I.Sh.I.
	23:45	I.Tr.E.	Aug. 24	10:19	I.Tr.I.		1:59	I.Oc.D.		19:56	I.Tr.E.
	23:55	I.Sh.E.		10:34	I.Sh.I.		2:21	II.Sh.I.		20:19	I.Sh.E.
Aug. 21	18:00	II.Oc.D.		12:37	I.Tr.E.		2:41	III.Sh.I.	Aug. 30	14:50	II.Tr.I.
	18:41	I.Oc.D.		12:52	I.Sh.E.		4:35	II.Tr.E.		14:51	I.Oc.D.
	21:09	I.Ec.R.	Aug. 25	7:07	II.Oc.D.		4:35	I.Ec.R.		14:59	III.Oc.D.
	21:17	II.Ec.R.		7:33	I.Oc.D.		5:02	III.Tr.E.		15:38	II.Sh.I.
Aug. 22	15:53	I.Tr.I.		10:06	I.Ec.R.		5:12	II.Sh.E.		17:32	I.Ec.R.
	16:05	I.Sh.I.		10:36	II.Ec.R.		6:20	III.Sh.E.		17:42	II.Tr.E.
	18:11	I.Tr.E.		14:58	IV.Tr.I.		23:11	I.Tr.I.		18:30	II.Sh.E.
	18:24	I.Sh.E.		17:37	IV.Sh.I.		23:32	I.Sh.I.		20:16	III.Ec.R.
Aug. 23	11:41	III.Oc.D.		19:38	IV.Tr.E.	Aug. 28	1:29	I.Tr.E.	Aug. 31	12:04	I.Tr.I.
	12:36	II.Tr.I.		22:24	IV.Sh.E.		1:50	I.Sh.E.		12:29	I.Sh.I.
	13:03	II.Sh.I.	Aug. 26	4:45	I.Tr.I.		20:16	II.Oc.D.		14:22	I.Tr.E.
	13:07	I.Oc.D.		5:03	I.Sh.I.		20:25	I.Oc.D.		14:48	I.Sh.E.
	15:28	II.Tr.E.		7:03	I.Tr.E.		23:03	I.Ec.R.			
	15:38	I.Ec.R.		7:21	I.Sh.E.		23:55	II.Ec.R.			

Phenomena of Jupiter's Moons, September 2009

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.

Sept. 1	9:17	I.Oc.D.		22:14	I.Sh.E.	Sept. 11	2:42	I.Tr.I.		18:30	II.Ec.R.			
	9:24	II.Oc.D.	Sept. 6	16:35	I.Oc.D.			3:22	I.Sh.I.	Sept. 16	10:02	I.Tr.I.		
	12:01	I.Ec.R.			17:06		II.Tr.I.		5:00		I.Tr.E.		10:49	I.Sh.I.
	13:14	II.Ec.R.			18:13		II.Sh.I.		5:25		IV.Tr.I.		12:20	I.Tr.E.
Sept. 2	6:30	I.Tr.I.			18:19	III.Oc.D.		5:40	I.Sh.E.			13:07	I.Sh.E.	
	6:58	I.Sh.I.		19:27	I.Ec.R.		10:06	IV.Tr.E.	Sept. 17	7:14	I.Oc.D.			
	8:48	I.Tr.E.		19:57	II.Tr.E.		11:52	IV.Sh.I.			8:32	II.Tr.I.		
	9:16	I.Sh.E.		21:05	II.Sh.E.		16:36	IV.Sh.E.			10:06	II.Sh.I.		
23:19	IV.Oc.D.	Sept. 7	0:17	III.Ec.R.		23:54	I.Oc.D.			10:19	I.Ec.R.			
Sept. 3	3:43		I.Oc.D.		13:49	I.Tr.I.	Sept. 12	0:52	II.Oc.D.		11:23	II.Tr.E.		
	3:58		II.Tr.I.		14:25	I.Sh.I.			2:53	I.Ec.R.		11:28	III.Tr.I.	
	4:43		III.Tr.I.		16:07	I.Tr.E.			5:12	II.Ec.R.		12:58	II.Sh.E.	
	4:56	II.Sh.I.		16:43	I.Sh.E.			21:09	I.Tr.I.		14:44	III.Sh.I.		
	6:29	I.Ec.R.	Sept. 8	11:02	I.Oc.D.		21:51	I.Sh.I.		15:06	III.Tr.E.			
	6:42	III.Sh.I.			11:42	II.Oc.D.		23:27	I.Tr.E.		18:23	III.Sh.E.		
	6:49	II.Tr.E.			13:55	I.Ec.R.	Sept. 13	0:09	I.Sh.E.	Sept. 18	4:29	I.Tr.I.		
	7:47	II.Sh.E.			15:52	II.Ec.R.			18:21		I.Oc.D.		5:18	I.Sh.I.
	8:20	III.Tr.E.	Sept. 9	8:16	I.Tr.I.			19:22	II.Tr.I.			6:47	I.Tr.E.	
	8:35	IV.Ec.R.			8:54	I.Sh.I.			20:48		II.Sh.I.		7:36	I.Sh.E.
	10:21	III.Sh.E.			10:34	I.Tr.E.		21:22	I.Ec.R.	Sept. 19	1:41	I.Oc.D.		
Sept. 4	0:56	I.Tr.I.			11:12	I.Sh.E.		21:42	III.Oc.D.			3:12	II.Oc.D.	
	1:27	I.Sh.I.	Sept. 10	5:28	I.Oc.D.		22:14	II.Tr.E.			4:48	I.Ec.R.		
	3:14	I.Tr.E.			6:14	II.Tr.I.		23:40	II.Sh.E.			7:50	II.Ec.R.	
	3:45	I.Sh.E.			7:31	II.Sh.I.	Sept. 14	4:18	III.Ec.R.		14:06	IV.Oc.D.		
	22:09	I.Oc.D.			8:04	III.Tr.I.			15:35	I.Tr.I.		18:48	IV.Oc.R.	
	22:33	II.Oc.D.		8:24	I.Ec.R.			16:20	I.Sh.I.		22:03	IV.Ec.D.		
Sept. 5	0:58	I.Ec.R.		9:05	II.Tr.E.			17:53	I.Tr.E.		22:56	I.Tr.I.		
	2:33	II.Ec.R.		10:22	II.Sh.E.		18:38	I.Sh.E.		23:47	I.Sh.I.			
	19:23	I.Tr.I.		10:43	III.Sh.I.	Sept. 15	12:47	I.Oc.D.	Sept. 20	1:13	I.Tr.E.			
	19:56	I.Sh.I.		11:41	III.Tr.E.			14:01		II.Oc.D.		2:05	I.Sh.E.	
21:41	I.Tr.E.		14:22	III.Sh.E.			15:50	I.Ec.R.			2:44	IV.Ec.R.		

	20:07	I.Oc.D.		12:45	I.Sh.I.	Sept. 26	3:28	I.Oc.D.		6:07	IV.Sh.I.
	21:41	II.Tr.I.		14:07	I.Tr.E.		5:35	II.Oc.D.		8:18	III.Oc.R.
	23:16	I.Ec.R.		15:02	I.Sh.E.		6:43	I.Ec.R.		8:41	III.Ec.D.
	23:24	II.Sh.I.	Sept. 24	9:01	I.Oc.D.		10:28	II.Ec.R.		10:47	IV.Sh.E.
Sept. 21	0:32	II.Tr.E.		10:51	II.Tr.I.	Sept. 27	0:44	I.Tr.I.		12:20	III.Ec.R.
	1:09	III.Oc.D.		12:14	I.Ec.R.		1:43	I.Sh.I.		19:11	I.Tr.I.
	2:15	II.Sh.E.		12:42	II.Sh.I.		3:01	I.Tr.E.		20:11	I.Sh.I.
	8:19	III.Ec.R.		13:42	II.Tr.E.		4:00	I.Sh.E.		21:29	I.Tr.E.
	17:23	I.Tr.I.		14:58	III.Tr.I.		20:35	IV.Tr.I.		22:29	I.Sh.E.
	18:16	I.Sh.I.		15:33	II.Sh.E.		21:55	I.Oc.D.	Sept. 29	16:22	I.Oc.D.
	19:40	I.Tr.E.		18:36	III.Tr.E.	Sept. 28	0:02	II.Tr.I.		18:46	II.Oc.D.
	20:33	I.Sh.E.		18:47	III.Sh.I.		1:11	I.Ec.R.		19:40	I.Ec.R.
Sept. 22	14:34	I.Oc.D.		22:24	III.Sh.E.		1:17	IV.Tr.E.		23:47	II.Ec.R.
	16:23	II.Oc.D.	Sept. 25	6:17	I.Tr.I.		1:59	II.Sh.I.	Sept. 30	13:38	I.Tr.I.
	17:45	I.Ec.R.		7:14	I.Sh.I.		2:53	II.Tr.E.		14:40	I.Sh.I.
	21:09	II.Ec.R.		8:34	I.Tr.E.		4:39	III.Oc.D.		15:56	I.Tr.E.
Sept. 23	11:50	I.Tr.I.		9:31	I.Sh.E.		4:51	II.Sh.E.		16:58	I.Sh.E.

Phenomena of Jupiter's Moons, October 2009

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.

Oct. 1	10:49	I.Oc.D.	Oct. 6	16:20	III.Ec.R.	Oct. 10	7:06	I.Oc.D.	Oct. 15	20:49	I.Sh.E.	
	13:13	II.Tr.I.		21:01	I.Tr.I.		10:27	II.Oc.D.		0:23	IV.Sh.I.	
	14:09	I.Ec.R.		22:07	I.Sh.I.		10:33	I.Ec.R.		5:00	IV.Sh.E.	
	15:17	II.Sh.I.		23:18	I.Tr.E.		15:45	II.Ec.R.		14:29	I.Oc.D.	
	16:04	II.Tr.E.		0:24	I.Sh.E.		Oct. 11	4:24		I.Tr.I.	17:59	I.Ec.R.
	18:08	II.Sh.E.		5:45	IV.Oc.D.		5:34	I.Sh.I.		18:05	II.Tr.I.	
	18:32	III.Tr.I.		10:29	IV.Oc.R.		6:41	I.Tr.E.		20:29	II.Sh.I.	
	22:09	III.Tr.E.		16:16	IV.Ec.D.		7:51	I.Sh.E.		20:55	II.Tr.E.	
	22:49	III.Sh.I.		18:11	I.Oc.D.		Oct. 12	1:33		I.Oc.D.	23:20	II.Sh.E.
Oct. 2	2:26	III.Sh.E.	Oct. 7	20:55	IV.Ec.R.	Oct. 16	4:51	II.Tr.I.	1:54	III.Tr.I.		
	8:06	I.Tr.I.		21:12	II.Oc.D.		5:02	I.Ec.R.	5:31	III.Tr.E.		
	9:09	I.Sh.I.		21:35	I.Ec.R.		7:11	II.Sh.I.	6:53	III.Sh.I.		
	10:23	I.Tr.E.		2:25	II.Ec.R.		7:41	II.Tr.E.	10:29	III.Sh.E.		
	11:27	I.Sh.E.		15:28	I.Tr.I.		10:02	II.Sh.E.	11:47	I.Tr.I.		
Oct. 3	5:16	I.Oc.D.	Oct. 8	16:36	I.Sh.I.	Oct. 13	11:54	III.Oc.D.	Oct. 17	13:01	I.Sh.I.	
	7:59	II.Oc.D.		17:46	I.Tr.E.		15:33	III.Oc.R.		14:04	I.Tr.E.	
	8:38	I.Ec.R.		18:53	I.Sh.E.		16:44	III.Ec.D.		15:18	I.Sh.E.	
	13:06	II.Ec.R.		12:38	I.Oc.D.		20:21	III.Ec.R.		8:57	I.Oc.D.	
Oct. 4	2:33	I.Tr.I.	Oct. 9	15:38	II.Tr.I.	Oct. 14	22:51	I.Tr.I.	Oct. 19	12:28	I.Ec.R.	
	3:38	I.Sh.I.		16:04	I.Ec.R.		0:03	I.Sh.I.		12:56	II.Oc.D.	
	4:51	I.Tr.E.		17:53	II.Sh.I.		1:09	I.Tr.E.		18:23	II.Ec.R.	
	5:56	I.Sh.E.		18:28	II.Tr.E.		2:20	I.Sh.E.		6:15	I.Tr.I.	
	23:44	I.Oc.D.		20:44	II.Sh.E.		20:01	I.Oc.D.		7:30	I.Sh.I.	
Oct. 5	2:25	II.Tr.I.	Oct. 18	22:11	III.Tr.I.	Oct. 19	23:31	I.Ec.R.	8:33	I.Tr.E.		
	3:07	I.Ec.R.		1:48	III.Tr.E.		23:41	II.Oc.D.	9:47	I.Sh.E.		
	4:35	II.Sh.I.		2:51	III.Sh.I.		5:03	II.Ec.R.	3:25	I.Oc.D.		
	5:16	II.Tr.E.		6:28	III.Sh.E.		12:43	IV.Tr.I.	6:57	I.Ec.R.		
	7:26	II.Sh.E.		9:56	I.Tr.I.		17:19	I.Tr.I.	7:19	II.Tr.I.		
	8:14	III.Oc.D.		11:05	I.Sh.I.		17:27	IV.Tr.E.	9:47	II.Sh.I.		
	11:53	III.Oc.R.		12:13	I.Tr.E.		18:32	I.Sh.I.	10:09	II.Tr.E.		
	12:42	III.Ec.D.		13:22	I.Sh.E.		19:37	I.Tr.E.	12:38	II.Sh.E.		

Oct. 20	15:40	III.Oc.D.	Oct. 23	1:56	II.Sh.E.		9:49	II.Tr.I.		23:05	II.Tr.I.
	19:19	III.Oc.R.		3:10	IV.Oc.R.		12:23	II.Sh.I.		Oct. 30	1:41
	20:46	III.Ec.D.		5:42	III.Tr.I.		12:40	II.Tr.E.		1:56	II.Tr.E.
	0:23	III.Ec.R.		9:19	III.Tr.E.		15:14	II.Sh.E.		4:32	II.Sh.E.
	0:43	I.Tr.I.		10:30	IV.Ec.D.		19:30	III.Oc.D.		9:35	III.Tr.I.
	1:59	I.Sh.I.		10:54	III.Sh.I.		23:09	III.Oc.R.		13:12	III.Tr.E.
	3:01	I.Tr.E.		13:40	I.Tr.I.	Oct. 27	0:47	III.Ec.D.		14:56	III.Sh.I.
4:16	I.Sh.E.		14:30	III.Sh.E.			2:37	I.Tr.I.		15:34	I.Tr.I.
Oct. 21	21:53	I.Oc.D.		14:57	I.Sh.I.		3:55	I.Sh.I.		16:52	I.Sh.I.
	1:26	I.Ec.R.		15:06	IV.Ec.R.		4:25	III.Ec.R.		17:51	I.Tr.E.
	2:12	II.Oc.D.		15:57	I.Tr.E.		4:54	I.Tr.E.		18:31	III.Sh.E.
	7:42	II.Ec.R.		17:13	I.Sh.E.		6:11	I.Sh.E.		19:09	I.Sh.E.
	19:12	I.Tr.I.	Oct. 24	10:49	I.Oc.D.		23:45	I.Oc.D.	Oct. 31	5:54	IV.Tr.I.
	20:28	I.Sh.I.			14:24	I.Ec.R.	Oct. 28	3:21		I.Ec.R.	
	21:29	I.Tr.E.		15:28	II.Oc.D.			4:45	II.Oc.D.		12:42
Oct. 22	22:45	I.Sh.E.		21:01	II.Ec.R.		10:20	II.Ec.R.		16:19	I.Ec.R.
	16:21	I.Oc.D.	Oct. 25	8:08	I.Tr.I.		21:05	I.Tr.I.		18:03	II.Oc.D.
	19:55	I.Ec.R.			9:26	I.Sh.I.		22:24	I.Sh.I.		18:40
	20:34	II.Tr.I.		10:25	I.Tr.E.		23:22	I.Tr.E.		23:13	IV.Sh.E.
	22:24	IV.Oc.D.		11:42	I.Sh.E.	Oct. 29	0:40	I.Sh.E.		23:39	II.Ec.R.
	23:05	II.Sh.I.	Oct. 26	5:17	I.Oc.D.			18:14	I.Oc.D.		
	23:24	II.Tr.E.			8:52	I.Ec.R.		21:50	I.Ec.R.		

Phenomena of Jupiter's Moons, November 2009

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.

Nov. 1	10:02	I.Tr.I.		7:09	II.Sh.E.		8:43	I.Tr.E.		15:13	I.Sh.I.	
	11:21	I.Sh.I.		13:32	III.Tr.I.		8:51	III.Ec.D.		16:10	I.Tr.E.	
	12:19	I.Tr.E.		17:09	III.Tr.E.		10:03	I.Sh.E.		17:29	I.Sh.E.	
	13:38	I.Sh.E.		17:29	I.Tr.I.		12:28	III.Ec.R.	Nov. 16	11:01	I.Oc.D.	
Nov. 2	7:11	I.Oc.D.		18:48	I.Sh.I.	Nov. 11	3:34	I.Oc.D.		14:39	I.Ec.R.	
	10:48	I.Ec.R.		18:58	III.Sh.I.		7:12	I.Ec.R.		17:34	II.Tr.I.	
	12:22	II.Tr.I.		19:45	I.Tr.E.		9:58	II.Oc.D.		20:12	II.Sh.I.	
	14:59	II.Sh.I.		21:05	I.Sh.E.		15:36	II.Ec.R.	20:25	II.Tr.E.		
	15:13	II.Tr.E.		22:33	III.Sh.E.	Nov. 12	0:55	I.Tr.I.		23:04	II.Sh.E.	
	17:50	II.Sh.E.	Nov. 7	14:37	I.Oc.D.		2:15	I.Sh.I.	Nov. 17	0:04	IV.Tr.I.	
	23:26	III.Oc.D.		18:14	I.Ec.R.		3:12	I.Tr.E.		4:49	IV.Tr.E.	
Nov. 3	3:05	III.Oc.R.			20:39		II.Oc.D.	4:32		I.Sh.E.	7:29	III.Oc.D.
	4:31	I.Tr.I.		Nov. 8	2:17	II.Ec.R.	22:03	I.Oc.D.		8:23	I.Tr.I.	
	4:50	III.Ec.D.	11:58		I.Tr.I.	Nov. 13	1:41	I.Ec.R.	9:42	I.Sh.I.		
	5:50	I.Sh.I.	13:17		I.Sh.I.		4:16	II.Tr.I.	10:40	I.Tr.E.		
6:48	I.Tr.E.	14:14	I.Tr.E.		6:54		II.Sh.I.	11:08	III.Oc.R.			
	8:07	I.Sh.E.		15:34	I.Sh.E.			7:06	II.Tr.E.		11:58	I.Sh.E.
	8:27	III.Ec.R.		16:04	IV.Oc.D.		9:45	II.Sh.E.		12:53	III.Ec.D.	
Nov. 4	1:39	I.Oc.D.		20:50	IV.Oc.R.		17:34	III.Tr.I.		12:57	IV.Sh.I.	
	5:17	I.Ec.R.	Nov. 9	4:45	IV.Ec.D.		19:24	I.Tr.I.		16:29	III.Ec.R.	
	7:20	II.Oc.D.		9:06	I.Oc.D.	20:44	I.Sh.I.		17:26	IV.Sh.E.		
	12:58	II.Ec.R.		9:17	IV.Ec.R.	21:12	III.Tr.E.	Nov. 18	5:30	I.Oc.D.		
23:00	I.Tr.I.	12:43		I.Ec.R.	21:41	I.Tr.E.	9:08		I.Ec.R.			
Nov. 5	0:19	I.Sh.I.		14:57	II.Tr.I.		23:01		I.Sh.E.		12:38	II.Oc.D.
	1:17	I.Tr.E.		17:36	II.Sh.I.		23:01		III.Sh.I.		18:13	II.Ec.R.
	2:36	I.Sh.E.		17:48	II.Tr.E.	Nov. 14	2:35	III.Sh.E.	Nov. 19	2:52	I.Tr.I.	
	20:08	I.Oc.D.		20:27	II.Sh.E.		16:32	I.Oc.D.		4:11	I.Sh.I.	
23:46	I.Ec.R.	Nov. 10	3:25	III.Oc.D.			20:10	I.Ec.R.		5:09	I.Tr.E.	
Nov. 6	1:39		II.Tr.I.		6:26		I.Tr.I.			23:18	II.Oc.D.	
	4:17		II.Sh.I.		7:04	III.Oc.R.	Nov. 15	4:55	II.Ec.R.	Nov. 20	0:00	I.Oc.D.
	4:30		II.Tr.E.		7:46	I.Sh.I.		13:54	I.Tr.I.		3:36	I.Ec.R.

	6:54	II.Tr.I.		18:08	I.Tr.E.		11:03	I.Ec.R.		1:36	I.Tr.E.
	9:31	II.Sh.I.		19:25	I.Sh.E.		15:19	II.Oc.D.		1:51	III.Tr.I.
	9:45	II.Tr.E.	Nov. 23	12:58	I.Oc.D.		15:26	IV.Oc.R.		2:52	I.Sh.E.
	12:22	II.Sh.E.		16:34	I.Ec.R.		20:51	II.Ec.R.		5:29	III.Tr.E.
	21:21	I.Tr.I.		20:14	II.Tr.I.		23:00	IV.Ec.D.		7:05	III.Sh.I.
	21:41	III.Tr.I.		22:49	II.Sh.I.	Nov. 26	3:28	IV.Ec.R.		10:40	III.Sh.E.
	22:40	I.Sh.I.		23:05	II.Tr.E.		4:50	I.Tr.I.		20:26	I.Oc.D.
	23:38	I.Tr.E.	Nov. 24	1:41	II.Sh.E.		6:07	I.Sh.I.	Nov. 29	0:01	I.Ec.R.
Nov. 21	0:56	I.Sh.E.		10:20	I.Tr.I.		7:06	I.Tr.E.		4:41	II.Oc.D.
	1:18	III.Tr.E.		11:36	III.Oc.D.		8:23	I.Sh.E.		10:10	II.Ec.R.
	3:03	III.Sh.I.		11:38	I.Sh.I.	Nov. 27	1:57	I.Oc.D.		17:49	I.Tr.I.
	6:37	III.Sh.E.		12:37	I.Tr.E.		5:32	I.Ec.R.		19:05	I.Sh.I.
	18:29	I.Oc.D.		13:54	I.Sh.E.		9:34	II.Tr.I.		20:05	I.Tr.E.
	22:05	I.Ec.R.		15:15	III.Oc.R.		12:08	II.Sh.I.		21:21	I.Sh.E.
Nov. 22	1:58	II.Oc.D.		16:54	III.Ec.D.		12:26	II.Tr.E.	Nov. 30	14:56	I.Oc.D.
	7:32	II.Ec.R.		20:31	III.Ec.R.		14:59	II.Sh.E.		18:30	I.Ec.R.
	15:51	I.Tr.I.	Nov. 25	7:28	I.Oc.D.		23:19	I.Tr.I.		22:55	II.Tr.I.
	17:09	I.Sh.I.		10:40	IV.Oc.D.	Nov. 28	0:36	I.Sh.I.			

Phenomena of Jupiter's Moons, December 2009

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.

Dec. 1	1:26	II.Sh.I.		3:34	I.Tr.E.	Dec. 10	2:06	II.Ec.R.		18:54	I.Oc.D.					
	1:46	II.Tr.E.		4:48	I.Sh.E.			8:47	I.Tr.I.		22:21	I.Ec.R.				
	4:18	II.Sh.E.		6:05	III.Tr.I.			9:58	I.Sh.I.	Dec. 15	4:22	II.Tr.I.				
	12:18	I.Tr.I.		9:42	III.Tr.E.			11:04	I.Tr.E.		6:40	II.Sh.I.				
	13:33	I.Sh.I.		11:07	III.Sh.I.			12:14	I.Sh.E.		7:15	II.Tr.E.				
	14:35	I.Tr.E.		14:41	III.Sh.E.		Dec. 11	5:54	I.Oc.D.		9:32	II.Sh.E.				
	15:48	III.Oc.D.		22:25	I.Oc.D.				9:23		I.Ec.R.	16:16	I.Tr.I.			
	15:50	I.Sh.E.	Dec. 6	1:57	I.Ec.R.				15:00		II.Tr.I.	17:25	I.Sh.I.			
	19:27	III.Oc.R.			7:24			II.Oc.D.			17:22	II.Sh.I.	18:33	I.Tr.E.		
	20:56	III.Ec.D.			12:47			II.Ec.R.			17:52	II.Tr.E.	19:41	I.Sh.E.		
Dec. 2	0:32	III.Ec.R.			19:47	I.Tr.I.			20:14		II.Sh.E.	Dec. 16	0:21	III.Oc.D.		
	9:25	I.Oc.D.			21:00	I.Sh.I.		Dec. 12	3:17		I.Tr.I.		4:00	III.Oc.R.		
	12:59	I.Ec.R.			22:04	I.Tr.E.				4:27	I.Sh.I.		5:00	III.Ec.D.		
	18:02	II.Oc.D.			23:17	I.Sh.E.				5:34	I.Tr.E.		8:35	III.Ec.R.		
	23:28	II.Ec.R.		Dec. 7	16:54	I.Oc.D.				6:02	IV.Oc.D.		13:24	I.Oc.D.		
	Dec. 3	6:48			I.Tr.I.		20:25		I.Ec.R.		6:43		I.Sh.E.	16:50	I.Ec.R.	
		8:02			I.Sh.I.	Dec. 8	1:38		II.Tr.I.		10:21		III.Tr.I.	23:32	II.Oc.D.	
		9:05	I.Tr.E.				4:03		II.Sh.I.		10:47		IV.Oc.R.	Dec. 17	4:43	II.Ec.R.
		10:19	I.Sh.E.				4:30		II.Tr.E.		13:59		III.Tr.E.		10:46	I.Tr.I.
		19:07	IV.Tr.I.				6:55		II.Sh.E.		15:09		III.Sh.I.		11:54	I.Sh.I.
23:52		IV.Tr.E.			14:17		I.Tr.I.			17:16	IV.Ec.D.	13:03	I.Tr.E.			
Dec. 4		3:55	I.Oc.D.				15:29	I.Sh.I.		18:43	III.Sh.E.	14:10	I.Sh.E.			
		7:15	IV.Sh.I.				16:34	I.Tr.E.		21:39	IV.Ec.R.	Dec. 18	7:54		I.Oc.D.	
		7:28	I.Ec.R.				17:45	I.Sh.E.	Dec. 13	0:24	I.Oc.D.		11:19		I.Ec.R.	
		11:40	IV.Sh.E.		20:03		III.Oc.D.			3:52	I.Ec.R.		17:45		II.Tr.I.	
	12:16	II.Tr.I.		23:42	III.Oc.R.			10:10		II.Oc.D.	19:59		II.Sh.I.			
	14:45	II.Sh.I.	Dec. 9	0:58	III.Ec.D.		15:24	II.Ec.R.		20:38	II.Tr.E.					
	15:08	II.Tr.E.			4:34	III.Ec.R.		21:47		I.Tr.I.	22:51		II.Sh.E.			
	17:36	II.Sh.E.			11:24	I.Oc.D.		22:56		I.Sh.I.	Dec. 19		5:16	I.Tr.I.		
	Dec. 5	1:17		I.Tr.I.		14:54	I.Ec.R.	Dec. 14		0:03			I.Tr.E.	6:22	I.Sh.I.	
		2:31		I.Sh.I.		20:47	II.Oc.D.						1:12	I.Sh.E.	7:33	I.Tr.E.

	8:39	I.Sh.E.		12:10	II.Sh.E.	Dec. 26	1:29	II.Sh.E.		11:31	IV.Ec.D.
	14:40	III.Tr.I.		18:16	I.Tr.I.		7:17	I.Tr.I.		11:55	II.Sh.I.
	18:18	III.Tr.E.		19:20	I.Sh.I.		8:18	I.Sh.I.		12:49	II.Tr.E.
	19:10	III.Sh.I.		20:33	I.Tr.E.		9:34	I.Tr.E.		14:48	II.Sh.E.
	22:44	III.Sh.E.		21:37	I.Sh.E.		10:34	I.Sh.E.		15:49	IV.Ec.R.
Dec. 20	2:24	I.Oc.D.	Dec. 23	4:43	III.Oc.D.		19:02	III.Tr.I.		20:17	I.Tr.I.
	5:48	I.Ec.R.		8:22	III.Oc.R.		22:40	III.Tr.E.		21:16	I.Sh.I.
	12:56	II.Oc.D.		9:03	III.Ec.D.		23:12	III.Sh.I.		22:34	I.Tr.E.
	14:53	IV.Tr.I.		12:38	III.Ec.R.	Dec. 27	2:45	III.Sh.E.		23:32	I.Sh.E.
	18:01	II.Ec.R.		15:24	I.Oc.D.		4:24	I.Oc.D.	Dec. 30	9:06	III.Oc.D.
	19:37	IV.Tr.E.		18:45	I.Ec.R.		7:43	I.Ec.R.		12:44	III.Oc.R.
	23:46	I.Tr.I.	Dec. 24	2:19	II.Oc.D.		15:43	II.Oc.D.		13:04	III.Ec.D.
Dec. 21	0:51	I.Sh.I.		7:19	II.Ec.R.		20:38	II.Ec.R.		16:39	III.Ec.R.
	1:33	IV.Sh.I.		12:47	I.Tr.I.	Dec. 28	1:47	I.Tr.I.		17:25	I.Oc.D.
	2:03	I.Tr.E.		13:49	I.Sh.I.		2:47	I.Sh.I.		20:41	I.Ec.R.
	3:08	I.Sh.E.		15:04	I.Tr.E.		4:04	I.Tr.E.	Dec. 31	5:07	II.Oc.D.
	5:53	IV.Sh.E.		16:05	I.Sh.E.		5:03	I.Sh.E.		9:56	II.Ec.R.
	20:54	I.Oc.D.	Dec. 25	9:54	I.Oc.D.		22:54	I.Oc.D.		14:47	I.Tr.I.
Dec. 22	0:16	I.Ec.R.		13:14	I.Ec.R.	Dec. 29	2:02	IV.Oc.D.		15:44	I.Sh.I.
	7:08	II.Tr.I.		20:32	II.Tr.I.		2:12	I.Ec.R.		17:04	I.Tr.E.
	9:18	II.Sh.I.		22:36	II.Sh.I.		6:44	IV.Oc.R.		18:01	I.Sh.E.
	10:01	II.Tr.E.		23:25	II.Tr.E.		9:56	II.Tr.I.			