

**Night Highlights** – Dec.2015 through Dec.2016 by Dr. Bob Doyle, Frostburg State Planetarium

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**MOON** – Earth's companion both orbits Earth and rotates in **27.32** E. days so one side of moon always faces Earth (while other side is turned away from us). Moon's cycle of lighted shapes (phases) lasts **29.53** E. days, as the phases also depend on direction of sun (appears to move about 30 degrees eastward each month along zodiac).

The moon is seen about **13** days growing in the evening from a slender crescent ( ) to **Full**, followed by an equal time shrinking (mainly seen in the a.m. sky) and then 3 days hidden in sun's glare.

**Key Moon Phases** (D) moon ½ full in evening (best for crater & mountain viewing ) & (O) full moon (see all lava plains) (Dec. '15, 18 -D, 25 - O) // (Jan. '16, 15 - D, 23 - O) // (Feb. '16, 14 - D, 22 - O) // (Mar. 15 - D, 23 - D) (Apr. 13 - D, 21 - O), // ( May 13 - D, 21 - O) // (Jun. 12- D, 27 - O)) // (Jul. 11 - D, 19 -O, 31) (Aug. 10 - D, 18 - O) // (Sep. 9 - D, 16 - O (Harvest Moon)) // (Oct. 8 - D, 15 - O (Hunters' Moon)) (Nov. 7 - D, 14 - O) // (Dec. 7 - D, 13 - O (Long Night Moon)) (D =even. ½ full (1<sup>st</sup> quarter) moon, O = full moon)

**THE 5 BRIGHT PLANETS (Mercury, Venus, Mars, Jupiter & Saturn):** Uranus, Neptune are much dimmer. When high above horizon, planets appear as points of light that shine steadily. Venus & Jupiter outshine all night stars, Mars is bright, Saturn of lesser brightness and Mercury's light flickers.

Below planet visibility descriptions for period from December '15 through December '16 (change each year)

**Mercury** – low in SW dusk in early January // low in SE dawn at end of Jan.//low in SW dusk in early April // TRANSITS SUN 5/9 (7:20 AM TO 2:42 PM) //low in SE dawn in at end of June // see SE dawn from Sept 24 to Oct.11 // low in SW dusk first 3 weeks of Dec.

(Mercury seen for about 2 weeks at a time due to its rapid motion about sun, taking only 88 days to orbit sun.)

**Venus** – brilliant point of light low in winter '16 Southeastern dusk, very low through spring, passes in back of sun on June 6, seen again low in the western twilight in September, noticeable in November and prominent in December

**Mars** – at start of year rises in East in the early AM hours, slowly creeps towards evening sky, rising before midnight in April, closest on May 22, appearing at -2 magnitude, nearly as bright in June, is seen in evening sky rest of year as it fades

**Jupiter** – rises in E before midnight in Jan., by mid Feb. rises in early evening, closest & brightest on March 8, seen all night long, splendid in Spring and early summer, drops into sun's glare in August, reappears in mid October in E dawn

**Saturn** – begins 2016 in Ophiuchus, in E dawn, rises before midnight in April, closest & brightest on June 3, seen low in the southern sky, disappears in the sunset glare in November

Best Evening Stars & Groups this Winter: **ORION** has 3 star belt with \* **Betelgeuse** above and \* **Rigel** below, Orion's belt points left to \***Sirius**, belt points right to \***Aldebaran**, golden \* **Capella** high in sky. (\* = star)

Best Evening Stars & Groups in Spring: **BIG DIPPER** upside down high in North, Dipper's handle arcs to golden \***Arcturus**, golden \* **Capella** high in NW, **LEO's** sickle high in South with \* **Regulus** for Leo's heart

Best Evening Stars & Groups in Summer: **BIG DIPPER** in NW with handle on top, golden \* **Arcturus** in West, white-blue \* **Vega** in East, **SCORPIUS** forms starry "J" in South with pink \* **Antares** on top

Best Evening Stars & Groups in Fall: **CASSIOPEIA** zig-zag in NE, **GREAT SQUARE** in SE, \* **Fomalhaut** low in South, **SUMMER TRIANGLE** in West with \* **Vega** lower right, \* **Capella** low in the NE

**Frostburg State Planetarium Shows, Gira Building, Room 186 :**

**December '15 6, 13, & 20:** "Wonders of the Winter Skies" – at 4 p.m. and 7 p.m. on Sundays

**NO PUBLIC PROGRAMS IN JANUARY 2016** - also call (301) 687-7799 during the month you seek title, times

**February:** "Hubble's Greatest Hits" Dates & times to Be Announced go to [www.frostburg.edu/planetarium/mlc](http://www.frostburg.edu/planetarium/mlc)

**March:** "Stonehenge and Other Monolithic Calendars" Dates and times To Be Announced see above web area

**April:** "When Galaxies Collide" – Dates and times to be Announced: go to [www.frostburg.edu/planetarium/mlc](http://www.frostburg.edu/planetarium/mlc)

**May:** Program Title, Dates and Times To Be Announced Visit web area [www.frostburg.edu/planetarium/mlc](http://www.frostburg.edu/planetarium/mlc)

**Public Programs Offered During Summer months every few weeks, Visit above web area or call above phone #**

**Monthly Programs to resume in September, 2016**

**Sky Watch heard most weekdays on WFWM, FSU's Public Supported Radio Station at 91.9 FM**

**Sun Events for Bedford, Cumberland, Hancock, Keyser, Meyersdale, Oakland, Romney every 10 days**

Starts 12/1 – Daylight time starts 2<sup>nd</sup> Sunday in March\*, Standard time begins 1st Sunday in November\*\*

(Unlike moon events, the times of sunrise and sunset at given towns change little from year to year)

	<u>Bedford</u>		<u>Cumberland</u>		<u>Hancock</u>		<u>Keyser</u>		<u>Meyersdale</u>		<u>Oakland</u>		<u>Romney</u>		
Date	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Date
12/01	7:17	4:49	7:17	4:51	7:15	4:49	7:17	4:53	7:18	4:52	7:19	4:55	7:14	4:50	12/01
12/11	7:26	4:49	7:26	4:51	7:24	4:48	7:27	4:52	7:27	4:52	7:28	4:54	7:23	4:50	12/11
12/21	7:32	4:52	7:32	4:54	7:30	4:52	7:34	4:55	7:34	4:55	7:34	4:57	7:29	4:53	12/21
01/01	7:36	4:59	7:36	5:01	7:34	4:59	7:36	5:03	7:38	5:02	7:38	5:05	7:33	5:00	1/01
01/11	7:35	5:09	7:35	5:11	7:33	5:08	7:36	5:12	7:37	5:11	7:37	5:14	7:33	5:10	1/11
01/21	7:31	5:20	7:31	5:22	7:29	5:19	7:32	5:23	7:33	5:22	7:33	5:25	7:29	5:20	1/21
02/01	7:23	5:33	7:23	5:35	7:21	5:32	7:23	5:36	7:25	5:35	7:25	5:38	7:20	5:33	2/01
02/11	7:12	5:45	7:13	5:47	7:10	5:44	7:13	5:48	7:14	5:47	7:15	5:49	7:10	5:45	2/11
02/21	6:59	5:57	7:00	5:58	6:58	5:56	7:01	5:59	7:01	5:59	7:02	6:01	6:58	5:56	2/21
03/01	6:48	6:06	6:49	6:07	6:46	6:05	6:49	6:08	6:50	6:08	6:51	6:10	6:46	6:05	3/01
03/11 *	7:32	7:16	7:33	7:18	7:31	7:15	7:34	7:18	7:34	7:19	7:36	7:20	7:34	7:18 *	3/11
03/21	7:17	7:25	7:18	7:28	7:18	7:26	7:19	7:29	7:19	7:29	7:21	7:30	7:16	7:26	3/21
04/01	6:59	7:38	7:00	7:39	6:57	7:37	7:01	7:40	7:01	7:40	7:02	7:41	6:58	7:37	4/01
04/11	6:43	7:48	6:44	7:49	6:42	7:47	6:45	7:49	6:45	7:50	6:47	7:51	6:42	7:46	4/11
04/21	6:28	7:58	6:29	7:59	6:27	7:57	6:31	7:59	6:30	7:59	6:32	8:00	6:28	7:56	4/21
05/01	6:14	8:07	6:16	8:08	6:14	8:06	6:17	8:08	6:17	8:09	6:19	8:10	6:15	8:05	5/01
05/11	6:03	8:17	6:05	8:18	6:02	8:15	6:06	8:18	6:06	8:19	6:08	8:20	6:04	8:15	5/11
05/21	5:54	8:27	5:56	8:27	5:54	8:25	5:57	8:27	5:57	8:28	5:59	8:29	5:55	8:24	5/21
06/01	5:47	8:36	5:50	8:36	5:47	8:34	5:51	8:36	5:50	8:37	5:53	8:38	5:48	8:33	6/01
06/11	5:45	8:42	5:47	8:42	5:44	8:40	5:48	8:42	5:47	8:44	5:50	8:44	5:46	8:39	6/11
06/21	5:45	8:46	5:47	8:46	5:45	8:44	5:44	8:46	5:48	8:48	5:51	8:48	5:46	8:43	6/21
	<u>Bedford</u>		<u>Cumberland</u>		<u>Hancock</u>		<u>Keyser</u>		<u>Meyersdale</u>		<u>Oakland</u>		<u>Romney</u>		
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07/01	5:49	8:47	5:51	8:47	5:48	8:45	5:42	8:47	5:51	8:48	5:54	8:49	5:50	8:44	7/01
07/11	5:45	8:44	5:57	8:44	5:54	8:42	5:48	8:45	5:57	8:46	6:00	8:46	5:56	8:41	7/11
07/21	6:02	8:39	6:04	8:39	6:02	8:37	6:06	8:39	6:05	8:40	6:08	8:41	6:03	8:36	7/21
08/01	6:12	8:29	6:14	8:29	6:12	8:27	6:15	8:30	6:15	8:31	6:17	8:31	6:13	8:27	8/01
08/11	6:21	8:18	6:23	8:18	6:21	8:16	6:24	8:18	6:24	8:19	6:26	8:20	6:22	8:15	8/11
08/21	6:31	8:04	6:33	8:05	6:30	8:02	6:34	8:05	6:33	8:06	6:36	8:07	6:31	8:02	8/21
09/01	6:41	7:46	6:43	7:47	6:41	7:44	6:44	7:47	6:44	7:48	6:46	7:49	6:41	7:44	9/01
09/11	6:51	7:30	6:52	7:31	6:50	7:28	6:53	7:31	6:53	7:32	6:55	7:33	6:50	7:28	9/11
09/21	7:00	7:13	7:01	7:14	6:59	7:12	7:02	7:15	7:02	7:15	7:04	7:17	6:59	7:12	9/21
10/01	7:10	6:57	7:11	6:58	7:09	6:56	7:12	6:59	7:12	6:59	7:13	7:01	7:09	6:56	10/01
10/11	7:20	6:41	7:21	6:42	7:19	6:40	7:21	6:43	7:22	6:43	7:23	6:45	7:19	6:40	10/11
10/21	7:31	6:26	7:31	6:28	7:29	6:25	7:32	6:29	7:32	6:29	7:33	6:31	7:29	6:26	10/21
11/01	7:43	6:12	7:43	6:14	7:41	6:11	7:44	6:15	7:45	6:14	7:45	6:17	7:41	6:12	11/01
11/11**	6:54	5:01	6:55	5:03	6:52	5:01	6:55	5:04	6:56	5:04	6:57	5:06	6:52	5:02	**11/11
11/21	7:06	4:54	7:06	4:56	7:04	4:53	7:06	4:57	7:07	4:56	7:08	4:59	7:03	4:54	11/21
12/01	7:16	4:49	7:16	4:51	7:14	4:49	7:17	4:53	7:18	4:52	7:18	4:55	7:14	4:50	12/01
12/11	7:26	4:49	7:26	4:51	7:23	4:48	7:26	4:52	7:27	4:51	7:27	4:54	7:23	4:50	12/11

12/21 7:32 4:52 / 7:32 4:54 / 7:30 4:52 / 7:32 4:55 / 7:34 4:55 / 7:34 4:57 / 7:29 4:53 12/21  
01/01 7:36 4:59 / 7:36 5:01 / 7:34 4:59 / 7:36 5:03 / 7:37 5:02 / 7:38 5:05 / 7:33 5:00 1/01