Snake River Skies

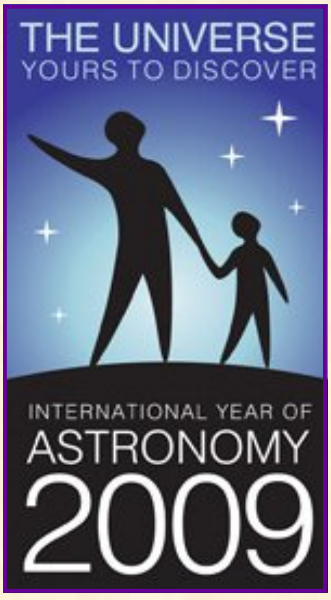
A Publication of the Magic Valley Astronomical Society

June 2009

Monthly Newsletter

SPECIAL INTEREST

The monthly meeting for the general membership, family, friends and Interested attendees will be held on Saturday the 13th of June. Rick Widmer will show the video "Comet Odyssey" and give an update on SHARE II and a potentially controversial change of ownership of some of the parts. If you have an interest in it, please be sure to attend, as he will be asking for a club decision during this meeting. We meet in the Rick Allen room of the Herrett Center on the campus of the College of Southern Idaho. There are some good events planned throughout the month of June. The meeting will start at 7:00 pm. Following the meeting is our star party at the Centennial Observatory beginning at 9:45 pm. Hopefully everyone will be able to attend.



The Night Sky of June

Many of June's best sky watching treats congregate in the morning sky, including four of the five planets visible to the unaided eye: Jupiter, Venus, Mars, and Mercury. Jupiter rises first and is visible through most of the post-midnight hours, with the other three peeking into view not too long before first light. The Moon sweeps past them around the summer solstice, livening up the hours before and during dawn.

5 Venus stands farthest from the Sun for its "morning-star" appearance. It is low in the east at first light, with faint Mars to its lower left.

6 The Moon huddles close to Antares, the brightest star of Scorpius. Across much of the United States, the Moon will be covering Antares as night falls.

13 Jupiter, which looks like a brilliant star, is to the lower left of the Moon early this morning. They are closest together at first light. Mercury stands farthest from the Sun for its current morning appearance. It is quite low in the east-northeast at first light, well to the lower left of brilliant Venus.

19 The crescent Moon huddles with the planets Venus and Mars in the east before dawn. Venus is the "morning star" to the lower right of the Moon, with fainter Mars between them.

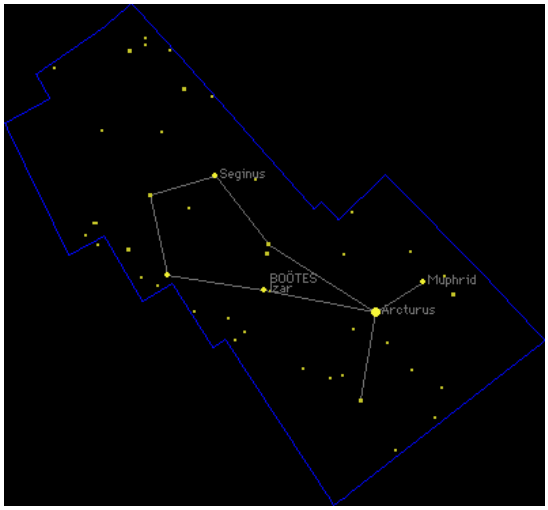
20 The Moon, the Pleiades, and the planets Venus, Mars, and Mercury form a beautiful arch in the east at first light.

21 Summer solstice occurs at 11:46 a.m. MDT. This is the longest day of the year in the northern hemisphere and marks the Sun's northernmost point in the sky.

25 Regulus and Saturn line up near the Moon at nightfall. Regulus is to the upper left of the Moon, with Saturn about twice as far to the upper left of Regulus.

26 Regulus, the brightest star of Leo, is to the right of the Moon this evening, with Saturn to their upper left.

27 Saturn, which looks like a golden star, is to the upper right of the Moon this evening. Regulus is to their lower right.



Boötes was one of the 48 constellations described by the 1st century astronomer Ptolemy and is a prominent June sky constellation.

LIFE CYCLE OF A STAR CONTINUES

Introduction

Brown dwarfs are celestial bodies, that exist light-years away from Earth. Brown dwarfs supposedly the missing like between stars and planets. According to Dictionary.com, a brown dwarf is a, “a celestial body that resembles a star but does not emit light because it is too small to ignite internal nuclear fusion. The planet Jupiter is a small brown dwarf.” A brief history of a brown dwarf is also helpful to understand how they were found and to help understand their life cycle. In the 1960s Astro-scientists and Jill Tarter, created hypothesizes, saying that, dense stars with smaller masses (like brown dwarfs), formed differently, that the were harder to find in space, and they emitted very little or no light energy. In the 1960s, these stars were called black dwarfs. Today these “black dwarfs” are a different type of star. Instead, these brown dwarfs emitted infrared IR spectrum. The first officially recognized brown dwarf was in 1995 as Tiede 1, an M8 object in the Pleiades cluster. Since 1995, hundreds of brown dwarfs have been identified.

Characteristics and Life Cycle

Brown dwarfs, like all things can be described. We can understand better brown dwarfs’ properties and life cycle through its temperature, its size, its color, its mass, and the chemicals it burns. Brown dwarfs, like most other stars, have different properties. A newer brown dwarf will have a higher temperature than an older brown dwarf. Depending on the size and mass, at the center of a brown dwarf it has to be less than 3 million degrees Kelvin (1340.33 degrees Fahrenheit or 726.85 degrees Celsius) or less. This is because they do not take part in nuclear fusion. The size of a brown dwarf also depends on its mass, age, and other physical properties. In order to be considered a brown dwarf, a star must be at or below 0.8 solar masses or 80 times the mass of Jupiter. At this level, the pressure and temperature are small enough to not create nuclear fusion. Unlike reports and studies, brown dwarfs and other sources of energy known as dark energy do not make up 90% of the universes mass, as they were thought to have been. This is according to John Stauffer of the Harvard-Smithsonian Center for Astrophysics. A brown dwarf, unlike its name is actually a reddish color. From far away it appears brown. The life cycle of a brown dwarf begins as a nebula, like most stars. The star continues its path until, it turns into a red giant. This is the star that comes right before the first stage of the brown dwarf at about 3,800 degrees Kelvin. This very large red giant then turns into the first stages of brown dwarfs. The first stage brown dwarf has decreased in its size and the temperature of the dwarf has dropped. Since a brown dwarf does not produce nuclear fusion, it can not change Hydrogen to Helium. Since a brown dwarf is not a thermonuclear power producing star, they can generate Lithium, a more delicate element. The star also has methane in it. These elements of the brown dwarf go through convection. As the brown dwarf ages (around one million years), it once again becomes smaller and becomes cooler. As these stages are happening, they attract dust and gas particles that condense and become compacted into a planet. This is the reason brown dwarfs are thought to be the missing link between stars and planets. Astrophysicists believe that brown dwarfs play an important role in stellar evolution. After the main brown dwarfs’ life cycle is through, they become black dwarfs.

This photo shows 50 new brown dwarfs in the Orion Nebula. Image Credit: Unknown

Concluded on the next page with Black Holes

Introduction to Black Holes

Black Holes are very mysterious and amazing celestial objects that are the last part of the life cycle of a star. The existence of black holes was predicted by Albert Einstein in his theory of relativity. Astronomers now believe that they have evidence to support their belief that black holes exist. The event horizon is a imaginary circle around the black hole. Everything that goes past the event horizon will be trapped by the black hole's extremely powerful gravity and will be lost forever until the black hole explodes, dispelling all the matter trapped inside it. Even though black holes are black, there is still evidence that they exist. If the black hole forms near a star, it will swallow the star. If is further away, it might cause the star to wobble. Some scientists believe super massive black holes may reside in the center of galaxies. Because no light can escape the gravity, this star is called a black hole. If there were super massive black holes in the center of galaxies, they would swallow up so much matter that they would have the mass of over a billion suns inside their singularity. This is just a small amount of information on a black hole.

How they Form

Black holes form much differently then other stars do. Black holes are the ending points of stars 10 to 15 times as massive as the sun. If a star as massive as that explodes in a supernova, stellar remnants will be left behind. With no outward forces working on the remnants, gravity will eventually make it collapse. The remnants will collapse into an infinite point of zero volume that has infinite density called a singularity. When stars with at least ten times the mass of the sun exhaust all their fuel, they no longer have the energy produced from nuclear fusion to support themselves. These stars explode and shed their outer shell of gas. The mass of the star that is still remaining is still several times as massive as the sun. This remaining mass collapses under its own gravity and forms a single point of infinite mass called a singularity. This is how a black hole forms.

Qualities

There are many different qualities of a black hole. As the mass and density of the black hole increases, the path of photons emitted are eventually bent and wrapped irrevocably around the star. The photons are put into orbit around the star by the star's gravity and can never escape. To be sucked into a black hole one would have to cross the event horizon, more technically called the Schwarzschild radius. When matter is pulled into a black hole, a process called accretion starts to work its magic. As the matter gets sucked into the black hole, about 10% of the energy gets radiated away. The other 90% of the energy is sucked into the black hole and just adds to its mass. In some cases, though, the energy doesn't even have time to radiate away so almost all of it adds to the black hole's mass. A smaller object, like an ant, would be warped less by a black hole then a larger object would. These are some of the different qualities of a black hole.

Schwarzschild Radius

The Schwarzschild radius is an imaginary circle around the black hole and signifies the point of no return. Once past the Schwarzschild radius, nothing can escape, not even light. To calculate the Schwarzschild radius, use the equation for escape speed. If our sun were replaced with a black hole of the same size, it would have a Schwarzschild radius of about 3 km. compared to its 700,000 km. radius. The earth would have to get very close to the sun to get sucked in. This is what the Schwarzschild radius is.

Detecting Them

Black holes are hard to detect and but they can still be detected. Since black holes are very small, and because light can't escape them, black holes are impossible to see. If the black hole passes though a cloud of interstellar gas or past a star, they can be detected because they warp it or suck it in. When matter gets closer to the black hole, it heats up, gains kinetic energy, and is warped by the tidal forces. The heat ionizes the atoms, and after being heated to a few million degrees Kelvin, the matter lets off X-Rays. When the matter passes the event horizon and hits the singularity, X-Rays are given off then, too. We are capable of seeing these X-Ray emissions with special instruments. This is how to detect the invisible black hole.

Concluded on the back.

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Trivia

I believe that every human has a finite number of heart-beats. I don't intend to waste any of mine running around doing exercises.
- Buzz Aldrin, Astronaut/NASA

MV Amateur Radio Field Day.

No this not a typo, nor is it placed in the wrong club's newsletter.—Editor.

The Magic Valley Amateur Radio Club will be holding its annual Field Day events at the Herrett Center and have asked the Magic Valley Astronomical Society to host a Solar observing session during the day. Later the MVARC folks will be renting the observatory from the Herrett Center for an evening of star gazing. Some of the club members of the MVAS are also members of the MVARC. There will be displays, a communications trailer, Amateur TV demos and many more projects to view. One closely related activity of the two clubs is the monitoring of sunspots which directly effects radio propagation. Field Day is an American Radio Relay League sanctioned event with points awarded for contacts, community participation, etc. So this year there is an opportunity to help both clubs even if all you do is show up and look around.

LUNAR PHASES


June 7 - 12:12 *

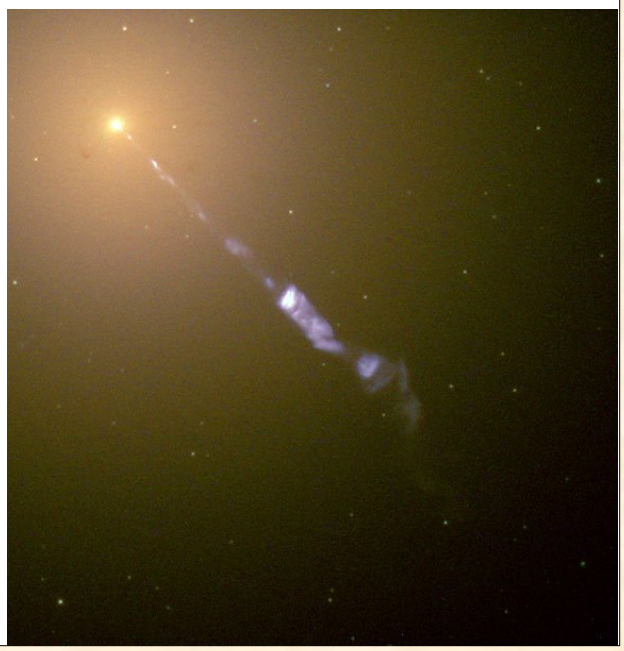

June 15 - 16:15 *


June 22 - 13:35 *


June 29 - 17:28 *

Spinning Black Holes (Black holes concluded)

Some black holes are now believed to spin. As if black holes aren't destructive enough, scientists now believe that some black holes spin rapidly like whirlpools and wrap the web of space-time with them. By using the X-Ray telescope Rossi, DR. Tod Strohmayer detected a spinning black hole. Almost every object in space spins including stars, planets, and galaxies. With black holes it is much harder to detect the spinning because they have no flat surface to watch spin around. We can see the light, however, from matter right before it plunges in to the black hole. The matter orbits the star before being sucked in. The black hole that the Strohmayer observed is of the stellar variety, meaning that it formed from a collapsing star. These are the qualities of a spinning black hole.



NOTE: Information about this article was obtained from various internet sources and is a brief compilation of those articles which appear in the public domain.

Article inspiration is from Wallace Blacker's Astronomy class. As an assignment during class Mr. Blacker asks students to do a project on the "Life Cycle of a Star." Thank you Mr. Wallace Blacker for continuing to inspire your former students.