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| The Seven Wonders of Our Solar SystemA look at our solar system from a human perspective of what a wonder is…Friday, November 23, 2012Benjamin Mendoza IIINew York City College of TechnologyAstronomy I – PHYS 1117.8682Professor Viviana Acquaviva |

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# Introduction

 Since the dawn of mankind, we have looked into the sky and wondered what those lights in the sky are? From China to Greece and even in some ancient cave drawings in the Americas, mankind has been fascinated with what is in the sky and has documented it in one way or another. Telescopes where invented to see the sky closer and then we started to launch them into space as we discovered that our solar system was unimaginably massive. In our attempts to map the sky and we discovered that the Earth was not the center of the universe and that the Sun was the center, or so we thought until telescopes showed us that the universe is truly spectacular. Our supposed universe was simply a solar system surrounded by a galaxy, amongst other galaxies who happen to be moving farther away from us and sometimes colliding causing stars, like our native star the Sun, to combine with other stars and sometimes even fizzling out causing supernovas that release amazing amounts of rare elements and gamma rays. Now while all of this sounds amazing and is really hard to grasp, it seems to pale in comparison to what we on Earth are a part of in our solar system.

 You may ask what makes our solar system so different from other solar systems. Well I can list seven wonders in our solar system that makes it unique to others in the observable universe, but should they be considered wonders at all? To say whether or not these seven wonders are indeed wonders we must look up the term “wonders”. Miriam-Webster’s dictionary defines a wonder as “a cause of astonishment or admiration”. Well that must mean something that is really pretty and cannot or is not easily explained. The History channel provided an amazing documentary and listed the seven wonders of our solar system which helped me with my term project and I am proud to share with my professor, classmates, and science buffs alike.

# The Seven Wonders of Our Solar System

 The seven wonders of the solar systems as listed by the documentary from the History Channel named “The Universe: 7 Wonders of the Solar System” (Long, 2010) are as followed.

# Number Seven

 The seventh wonder of our solar system is Enceladus and was discovered by German Astronomer William Herschel in 1789 (Soylent Communications). The NASA’s website description of Enceladus is as followed.

*“Enceladus [en-SELL-ah-dus] is one of the innermost moons of Saturn that reflects almost 100 percent of the sunlight that strikes it.” (National Aeronautics and Space Administration)*

 NASA’s Cassini spacecraft on November 2nd, 2005 saw, what is one of the brightest objects in that region of the solar system; become the only geologically active outer planetary moon. Most moons are geologically dead, but on Enceladus geysers of water and ice spew into the atmosphere, from its South Pole region where the geographic feature known as tiger stripes are, were caught flying miles high into space at about 1,400 miles per hour by Cassini. It is now believed that this shimmering moon holds liquid water and that the Cryovolcanism is the process that is used to describe this process. Scientist want to know why it is active as infrared maps show warm surface temperatures cause by the geysers as the heated liquid water comes out from inside the moon and turns into ice due to the surrounding space in the area which is cold. What makes this moon a wonder is its mystery of how much water does it hold. As to how this moon heats its water, guesses by scientist suggest that it may be from radioactive elements which decay and heat up the interior which would keep the water in a liquid state. The more accepted explanation is tidal mechanism heating, which is cause by the force of gravity exhorted by Saturn on the moon from the very eccentric elliptical orbit of the moon. This means that when Enceladus is closest to Saturn, friction causes the water to heat up and cracks in its icy South Pole tiger stripes allow the water to shoot into space. Now since water can host life, could there be life on Enceladus and what kinds of life forms would they be like? These basic questions are what make Enceladus wonder number seven.

# Number Six

 Wonder number six is not that far from Enceladus and is better known when discovered by Galileo Galilei in 1610 (Chaisson & McMillian, 2011). The Rings of Saturn origins have eluded scientist for years. Voyager first visited Saturn and now Cassini brings Saturn to a high definition three dimensional format which show that the rings are composed of ice and dust that range in the trillion trillions mark containing roughly 26 billion times the amount of water on Earth. Some thought of where all this matter came from are that a moon of Saturn got too close and was destroyed by its gravitational pull. Another idea is that the rings could be the leftovers of debris from a moon that was never able to form in the first place. Even the thought of a comet that got two close to Saturn was destroyed in the same process thought in the moon being destroyed and those leftovers formed the rings was considered. Further studies of the rings have found mountain ranges that rival the Alps within the rings these features are caused by the 62 moons in the rings of Saturn which cause distortion of the rings not otherwise noticeable until November 11th, 2009 by the Cassini Spacecraft. The origin still eludes scientist making this wonder number six and now we move on to wonder number five.

# Number Five

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 The Great Red Spot of Jupiter is believed to the biggest storm in our solar system. Scientist believe that the big red spot was once a collection of smaller white spots that combined into a single a big white spot. As that single big white spot began to collect more speed and dredge material deep within Jupiter the color then began to change to its now more familiar red color. Since its discovery in the 1650s scientists have wondered how long has this supersized hurricane been around and when will it disappear? What is known of the supersized hurricane is that it is three times the size of Earth with its supersized vortex traveling over five miles above the planets clouds at speeds of about 400 miles per hour winds. The Great Red Spot spins counterclockwise anti-cyclonic because of high pressure system on Jupiter unlike cyclones and hurricanes on Earth which spin clockwise due to the low pressure system on this planet.

# Fourth Wonder

 The Asteroid Belt is believed to be leftovers from the formation of the universe and this term seem to be coined in an English translation made by E.C. Otté in 1850 (Alexander, 1850). At first it was believe to be a planet that was destroyed into a bunch of rocky pieces, but scientists now believes that it is material that could not form into a planet due to gravitational pull from Jupiter and Mars, as well as, the other planets. If you were to zigzag through this family of asteroids you would see over 100 million miles of rock with some as small as six feet and others the size of cities. Even though there are approximately over billions of pieces of rock yet if they were all combined they would make an object smaller than the Earth’s moon. In movies the asteroid belt is pictured as a crowded bunch asteroid which you have to make some racetrack maneuvers to avoid but this could be further from the truth. The average distance between asteroids is a million miles. One peculiar object in the asteroid belt is the biggest asteroid in our solar system. It is 600 mile wide and makes up about one-fourth of the entire mass of the asteroid belt. Its name is Ceres and recently has been upgraded to the status of dwarf planet as its now downgraded partner Pluto. Scientist still do not know the origin of the Asteroid Belt which still keeps it at number four on this list.

# Number Three

 Olympus Mons, nicknamed after the famous Greek Mount Olympus of ancient Greek Mythology, was discovered on Mars by Mariner 4 of NASA in 1965 and is officially the largest volcano in our solar system (National Aeronautics and Space Administraion). This mega volcano is approximately 350 miles across, 13 miles high, and is currently dormant. Though this does not sounds like an unbelievable spectacle, but one should note that the largest volcano on Earth is Mauna Lao on the island of Hawaii at about 13,000 feet above sea level with a base of 56,000 feet from base to summit (Barclay, 2009), making Olympus Mons 100 times bigger than Mauna Lao and almost three times as tall as Mount Everest. Yet if you were to scale this mammoth volcano the slope is so gradual those scientists have compared it to walking up a hill that goes on forever. This is due to Mars’ low gravity and there being no plate tectonic activity which has allowed its formation. During the Martian Amazonian period this volcano was formed by eruption after eruption with successive layers of lava about 100 million years ago the lava had nowhere to go and with the low gravity system formed its massive base. At Olympus Mons peak you can view the edge Martian atmosphere. Though it is not a wonder how it is formed or what it is, the reason it is still a wonder is if the planet were to somehow reverse its cold atmospheric effect with an infusion of greenhouse gases, would the volcano come back to life as some scientist believe it may still be active underneath its surface.

# Number Two

 Now Olympus Mons active would be hot and reach some scorching temperatures it would be just a fraction of the temperature measured on the next wonder, the surface of the Sun. With oceans of 10,000 degree plasma, waves, winds, and massive eruptions as explosive as a billion tons of explosives the surface of our star and Earth’s best friend and foe is very chaotic. A process called convection occurs near the surface of our home star. The visible surface called the photosphere and if you were to be able to traverse it somehow it would be unbelievable noisy, hot, and violent. The noise comes from these huge magnetic storms that cause thunder like sounds. Furthermore, prominences rip into outer space that release huge amount of energy. NASA Solar and Heliospheric Observatory, nicknamed SOHO, looks at these prominences, as well as, Coronal Mass Ejections (CME’s) which contain billions tons of solar material that shoot out at speeds that can reach several million miles per hour. CME’s are as powerful as a billion atomic bombs which have led to the beautiful Northern Lights or Aurora displays, and have fried our electrical grids on earth, disabled satellites, and can seriously harm our astronauts with dosages of radiation from the x-rays CME’s release if the astronauts are not within the confines of a spaceship. In 2013 the Sun’s surface will host the solar maximum which can create the perfect storm which can destroy our communication systems. Trying to predict these storms are impossible at the moment, but scientists at SOHO are working hard to try and understand them, as well as, how the surface of the Sun works.

# Number One

 CME’s cannot destroy number one on the list of wonders of the solar system. The Earth is the only planet teeming with life as we know it. The fifth largest planet with one-tenth of its surface is covered with ice. The Earth’s hot interior has been churning magma which still erupts from volcanoes for billions of years. Liquid water covers two-thirds of its surface which makes our atmosphere rich with oxygen. Water an extremely important part in creating life with proteins and amino acids being able to create living cells that are the building blocks of life, are mixed with bacteria and evolved through photosynthesis to boost oxygen levels and further evolve those cells into more complex organisms. The only planet at the right distance from the Sun to support life and somehow over the time of billions of years passed which gave birth to humans who only came along about 200 thousand years ago. Since then we have helped shape the earth’s surface with cities and colossal monuments. But looking at our neighbors Mercury, Venus, and Mars, where did all this water come from. Well one possibility is that water came from comets and other icy space particles which slammed into the earth during its volcanic early days; as a matter of fact, mostly all rare forms of material such as gold and silver also have come from outer space and proof lies in the fact that these items which are rare on earth are abundant in space. No one really knows exactly how the Earth was formed or how life cam about but until we know for sure all we have are our theories and this is what makes Earth the number one wonder of our solar system and until life is found on another planet it will be the number one wonder of the Universe.

# Closing

 Though many cosmologist, astronomers, and astrophysicists are trying to look farther and deeper into outer space I believe nothing compares to the wonders within our own solar system and while the work of these individuals are collectively important, I believe we should focus on things closer to home only looking beyond our solar system to possible answers to how ours formed in comparison to others. There are still so many unanswered questions within our local system, so why not try solving these mysteries collectively and then start focusing on other systems collectively. As the good ole’ saying goes “Two heads are better than one” meaning collectively we can find answers faster.

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