SHENANDOAH ASTRONOMICAL SOCIETY

March 2011

SAS Meeting March 14

Lord Fairfax Community College
7:00 P. M. in the Board Room

March Program: Betty Wasiluk will show photos she obtained on her visit to Hawaii last fall. She will also explain the mission and the things she learned and experienced on the trip. This will be very interesting to all. So come on out the meeting.

We will meet in the Board Room once again. I have been told the computer problem is fixed so the projector system should work for us this time.

Something to Think About

The past century has brought about many changes in thought and life style. We have also learned a lot about our world and the universe that was formerly unknown. For example, at the turn of the 20th century astronomers were puzzling over whether our Milky Way Galaxy was the whole universe. That was a mystery at the time but was soon solved. Astronomers determined that we live in our own spiral galaxy like Andromeda and the billions of known galaxies that exist in clusters throughout the universe. Now the Hubble Space Telescope has photographed thousands of galaxies in only a tiny area of the sky in which former astronomers could see very little.

One of the mysteries up until the twentieth century was how the Sun works. The only theory before that time was that of Lord Kelvin of England: gravitational energy. That is, the squeezing or crushing of the body of the sun would cause a heat build-up just like when air is pressurized and the temperature goes up. However, the length of time that such a source of energy could work seemed to be far too short for the estimated age of the Earth by geologists. Then Albert Einstein said that mass and energy were basically the same but scientists still did not know how to get energy from the atoms, especially in the amount needed for the Sun. Some top scientists predicted that that would never happen.

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In the 1930's Hans Bethe and other scientists began to work out how mass could be transformed into energy. Under great pressure and in extreme temperatures like millions of degrees, it was found that two hydrogen nuclei could become a helium nucleus and give off energy in the process. The mystery was solved. The Sun produces energy by nuclear fusion according to Einstein's formula $E = MC^2$.

During this period, Edwin Hubble used the 100 inch telescope at Mount Wilson in California to measure the distances to distant galaxies and their Doppler redshifts. These observations, along with some earlier ones, showed that the universe is expanding. Another mystery solved, perhaps? Astronomers worked hard to determine the exact value of the Hubble constant. The Hubble Constant determines the speed of the expansion and the age of the universe that is pretty well established at 13.7 billion years.

Now here are some questions we would all like to have an answer for. What is the universe expanding into? What is outside the universe? What was there before our present universe was born? Is the universe infinite? However, we are told that these questions are not scientific questions because there is no way to answer them. A statement that cannot be verified or refuted is not allowed in a scientific context. However, there is still a lot of mystery. It has been said that the more questions we answer, the more answers we question.

Jim Adkins

Room here for someone else to fill in with your experiences, questions, or answers.

You can send contributions to the SAS newsletter.