the **Foghorn**

ROTARY CLUB OF HALF MOON BAY, P.O. BOX 31 HALF MOON BAY, CA. 94019

December 8, 2011

Dark Energy, Dark Matter and 'Normal Stuff'

It seems like everywhere I turned in the last couple of weeks I was encountering another interesting and usually amazing bit of information regarding our increasing discoveries about the universe and what it is made of. All of this "stuff" really gets me excited so I have looked for a few articles that might be of interest to you too, and included links to them and to our speaker from last week.

And one question that is running around my mind: Is it just because of the part of the country in which we live that so much of this is a part of our everyday environment? Of do people all over the US and the world get excited about it too?

For example, the last few days there have been the headlines in the news from the scientists at NASA Ames Research Center in Mountain View regarding additional information about the planet Kepler22b, that "it offers the best hope yet for future human habitation outside the Solar System. (http://www.telegraph.co.uk/science/space/8937173/Nasas-Kepler-space-telescope-finds-new-Earth.html).

Then yesterday the article in the New York Times and elsewhere about the discovery of the largest dark holes in the universe yet being discovered (http://www.nytimes.com/2011/12/06/science/space/astronomers-find-biggest-black-holes-yet.html?ref=blackholesspace). WOW ! From The Times: "*One of these newly surveyed monsters, which weighs as much as 21 billion Suns, is in an egg-shaped swirl of stars known as NGC 4889, the brightest galaxy in a sprawling cloud of thousands of galaxies about 336 million light-years away in the Coma constellation."* WOW AGAIN!!

And in addition, the several radio programs on NPR from San Francisco that seem to be on the air regularly about the Universe and what we are learning (including, as I write this, an interview by Michael Krasny with Ira Flatow of 'Science Friday' who at one point, were commenting on the current understanding of the make-up of the universe being : 4% stuff we know, and 20% Dark Matter and 70% Dark Energy. http://science.nasa.gov/astrophysics/focus-areas/what-is-dark-energy/ GREAT WEBSITE!

Which leads me right into our program presentation last week by Dennis Wright, Ph.D. of the Stanford Linear Accelerator Laboratory (SLAC – originally named Stanford Linear Accelerator Center) located in Menlo Park on Sand Hill Road right off of I-280. Actually, as we continue south on 280 we drive right over part of it.

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Calendar

December 8
SSA: Charise
Past Prez in attd: Susan
Program: JeanJacques: Estate Planning

December 15
SSA: Lisa
Past Prez in attd: Eric
Program: DAn K &Dan M: How to Keep Your Poclet from Being Picked!

December 22
Program: Dark

... the Staff:

- *Program Notes: Dianne*
- *Announcements: Patricia*
- *Photos: EJ*

Meeting notes

Pledge: Dr. Joy

Invocation: Dave Maahs

Visiting Rotarians:

- None

Guests:

- Chris – wife Sunneva

- Mary – Hugh Bowen

- Jordan – Bill Cook

- Dave A - Leighanna Murphy

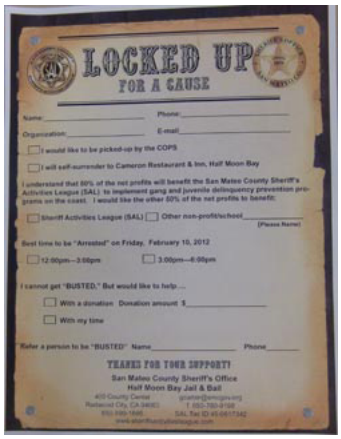
- Irwin – Karen, his office manager for 9 years, and Tom Murdoch

Announcements/Good News/Happy dollars

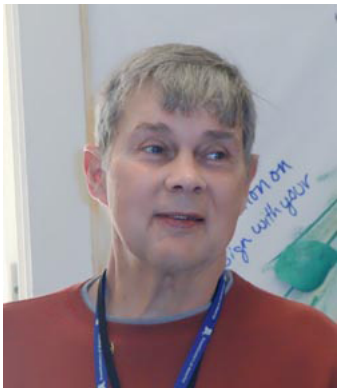
- Charise: Come to Night of Lights and help us decorate a 12' Doug Fir. There will be 12 Floats. Beautification Committee underwrote the cost of the lights.

- Jean: Night of Lights will include hula dancing.

- Sheriff's Athletic League: If we can get a team of Rotarians together, we can name the amount we want to raise and keep half of it. Volunteers will be locked up for a while.

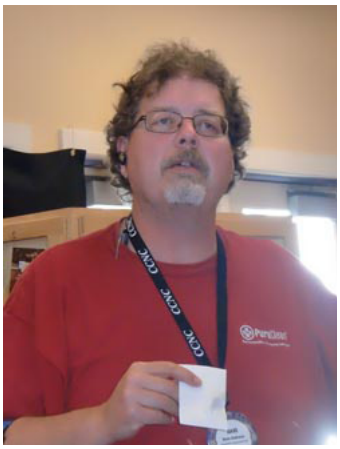


- Dan B. First meeting of the Website Committee, Catherine, Mitone, Rose, Dianne and Dan B.discussed improvements; and will meet again next Monday.



- Steve: Foundation: Howard, Teresa A, 1. George, Dan B, EJ, and Stecy won the trivia contest last week.

- Rotary Foundation Worksheet:
  1. 100% Sustaining Membership =$100 from each member
  2. 100% Paul Harris
  3. $1000 to Polio Plus
  4. TRF direct – we have eleven people signed up; need one more person to meet the goal.
  5. It would be great if you could give Jean a credit card for TRF.
- Dave Andrews: If members would bring in any old/broken/unwanted gold jewelry we can sell it for the gold.



- Jean: Payemtns made so far will show next month. We'd like everyone to donate $200 before Dec. 31, 2011.
- Mitone: Toy Wrap & potluck Dec 22 at the Ocean Colony Rec room. Bring wrapping paper, scissors and tape. Need help to move to move toys from OC to their next location.

Calendar: Wednesday RotaCare Chuckwagon Crew:

- 12/7/11 Dan & Heather(RotaCare canceled today)
- 12/14/11 Rose
- 12/21/11 Howard & Bev
- 12/28/11 Steve A
- 1/4/12 Dan & Heather
- Subs: Chris D, Jean, Charise, Eric, Stacy, Catherine.
- Seton only occasionally includes cookies w/ the food they're sending for the RotaCare volunteers. They welcome supplements to these meals, starters, salad, hot dish, dessert, any Wednesday.
- Outriders: J/M Traversero make dinners or bring food donated from various restaurants when available. Will you you contribute as well? Doesn't have to be fancy…
- *There are 15-20 volunteers weekly who come directly from work, many from o/t/h, north/east bay. To supplement their donated sandwich plates form Setons, Rotarians are asked to bring over food, (something you might bring to a potluck) to the RotaCare Clinic any Wednesday around 4-4:30p. Clinic hours begin at 5:00p continue until at least 8p. Questions, call Karen Larson, 799-9633.*

Calendar

- Next Website group meeting at Dianne's.
- 12/22/11 Toy wrap/ potluck, Ocean Colony Clubhouse
- 3/24/12 Fundraiser, IDES hall

Reach Within to Embrace Humanity

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He began his very straightforward, clear and "user friendly" presentation with these questions: "What is the world made of?" And, "Why go to the bottom of a mine to look for invisible particles?" (his current project to answer the first question).

Originally from the Sandusky Bay area of Ohio, Dennis Wright received a B.S in physics at Case Western Reserve University in Cleveland, Ohio and a Ph.D. in nuclear physics at the University of Illinois at Urbana-Champaign.

Dennis has done nuclear and high energy particle experiments at Los Alamos National Lab in New Mexico, the TRIUMF laboratory in Vancouver, Canada, the Stanford Linear Accelerator and the Large Hadron Collider in Switzerland http://press.web.cern.ch/public/en/LHC/LHC-en.html and also this fascinating link about the "God Particle", http://www.telegraph.co.uk/science/science-news/8659885/God-particle-The-Large-Hadron-Collider.html

In talking with Dennis after his presentation, I mentioned that I had followed the events surrounding the now abandoned Super Collider, cancelled in 1993, that was being built in Texas while we were living there and the terrible disappointment in the scientific community when the funding was cut. Dennis said he had also worked on that project. http://en.wikipedia.org/wiki/Superconducting_Super_Collider

He has given lectures and tutorials on physics software at universities and laboratories on five continents. To sum up what to him is at the heart of the message he is communicating in these lectures, he wrote a few things down for me before he left after his presentation.

" 1. We live in a time of scientific revolution. Our idea of what the universe is made of has changed several times within the last 30 years. The (ongoing) search for dark matter will tell us more about our place in the universe.

2. Such experiments are designed purely for the search for knowledge, but often have important practical spinoffs. So they are important on two levels."

more on the next page

In his presentation he compared the common understanding of the makeup of the universe in 1980 (95% "normal" matter and 5% "other stuff"), to that in 1990 (17% "normal matter" and 83% Dark Matter), to the current understanding (4.6% "stuff we know – normal matter) and 72% of everything else is Dark Energy and about 20% is Dark Matter). As he said we know a lot about the 4.6%, but not much about the rest.

His current project deep in a mine shaft in Canada using CSMS (Conversion X-Ray Mossbauer Spectroscopy) detector technology is attempting over the next 10 years or so to be able to "find" Dark Matter (currently understood to make up 20% of universe. Another search looking for Dark Energy (70% of what is believed to make up the universe, uses a di) ferent, much more expensive technology - the Hadron Collider in Switzerland (see link above).

Great program!!!! Do look up some of the links. I think they are exciting and helpful for those of us who are not scientists but are curious.

One of the questions was about whether there are any practical 'spin-offs' from all this research. In addition to what Dennis mentioned, I looked up a technical presentation related to the Super Collider and found from the 1990's this list.

TECHNICAL SPIN-OFFS

Medical Diagnostic Techniques

Accelerators and detector technologies developed for particle physics have seen widespread use in medical therapy, diagnostics, and instrumentation, including Magnetic Resonance Imaging (MRI), Computerized Axial Tomography (CAT), and Positron Emission Tomography (PET). The most recent Nobel Prize in Physics was awarded to Georges Charpak, a CERN physicist, for the development of particle detectors. His detectors now have wide applications in some of the most advanced medical diagnostics; their improved accuracy and response allow faster scanning and reduced radiation doses. The SSC detector collaborations are advancing and refining such technologies.

Cancer Therapy

Proton beam therapy has been used to treat more than 12,000 patients worldwide. At the SSC, the Southwestern Medical Center will operate a state-of-the-art proton therapy clinic for cancer treatment and research.

Superconducting Cable Technology

Before the advent of superconducting accelerators, the world's production of superconducting cable was only a few hundred pounds; as a result of accelerator R&D, present annual production is 200,000 pounds, and half is for commercial applications including MRI. The US Commerce Dept. estimates the worldwide market for superconducting products will reach $8 billion by the year 2000. Our investment in accelerator research made the US the leader in superconducting technology; our investment in the SSC will ensure continued leadership in the future.

Historical Precedents

The brilliant x-rays used to determine the structure of the AIDS virus came from electron synchrotrons that were first used in high-energy physics research. Ion-implantation accelerators are used to manufacture many of the semiconductor devices of modern electronics. Even the television screen and computer monitor are direct descendants of the very first particle accelerator, the cathode ray tube that was used to discover the electron.

Very Large Scale Integrated Circuits

Accelerators are becoming an important tool in the manufacture of advanced microchips. Intense beams generated by accelerators can imprint features less than one ten-thousandth of an inch across.

New High Tech Materials

A new plastic developed for the SSC by researchers at the University of Florida will be used in medical equipment. The new material can be sterilized in small accelerators without the use of environmentally hazardous chemicals.

Environmental Applications

Accelerator technology is used to measure long-lived isotopes. This provides important chronological information for application in environmental technology, e.g., waste disposal, ground water management, and studies of soil erosion and salinization.

Computer Applications

In concert with industry, the SSC Laboratory is designing ultra fast parallel computing systems capable of processing the equivalent of 10,000 floppy disks of data every second. This cooperative effort is expected to facilitate the entry of high performance electronics into the commercial marketplace.

Summary

The ultimate benefits to society are not fully known at this time; however, from experience we know that there will be large payoffs. When the basic secrets of electricity and magnetism were discovered in the 19th century, the consequences -- electric lights, air conditioners, worldwide communications, and computers -- were unforeseeable. It does not take a leap of faith to conclude that discoveries with the SSC may produce even more profound changes and adaptations of the world around us in the future; rather it would be extraordinary if it did not.

The story goes that, following a demonstration of the new miracle of electricity in 1831; Faraday was asked, *"What use is it?"* He responded, *"Sir, of what use is a newborn babe?"* --Ben Grinstein